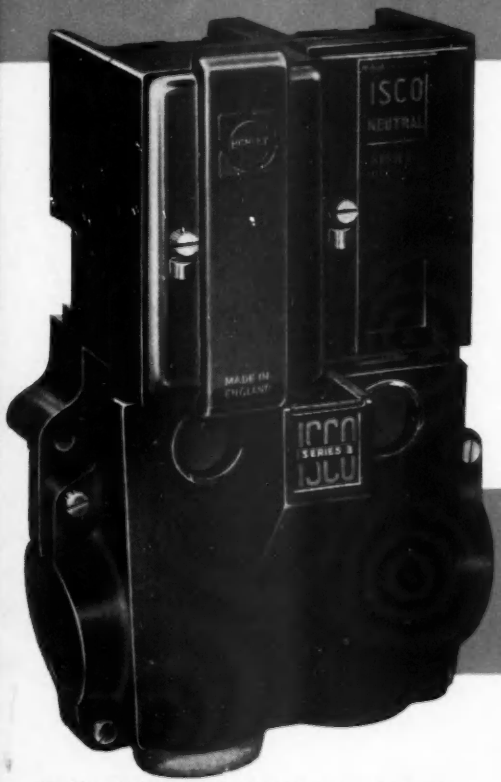
ELECTRICAL TIMES

THURSDAY
14 MAY
1953
NINEPENCE

INSULATED SERVICE FUSES



Double-pole Insulated Service Fuse arranged for one fuse and one neutral connector with combined 4-entry sealing chamber.

The following are interesting features :—

Double and Four-pole models with combined sealing chambers.

Single-pole with Neutral Connector Boxes and separate 2 and 4-pole Sealing Chambers.

Cartridge Fuse-links to B.S.88:1947.

For cable conductors up to .04 sq. in. or up to .06 sq. in.

With single or double entry Terminals.

All current carrying parts tinned.

UP TO 60 A 250 V

In the range of HENLEY Insulated Service Fuses there is an arrangement to meet your requirements. Please ask for Catalogue 43.

HENLEY

ELECTRICAL DISTRIBUTION EQUIPMENT

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.,
51-53 HATTON GARDEN, LONDON, E.C.1.

m and i

SELF-SUPPORTING HIGH HEAT MICANITE

for use in heating elements

Toaster element built on High Heat Micanite

M. & I. have developed the use of an inorganic bond which makes High Heat Micanite self-supporting.

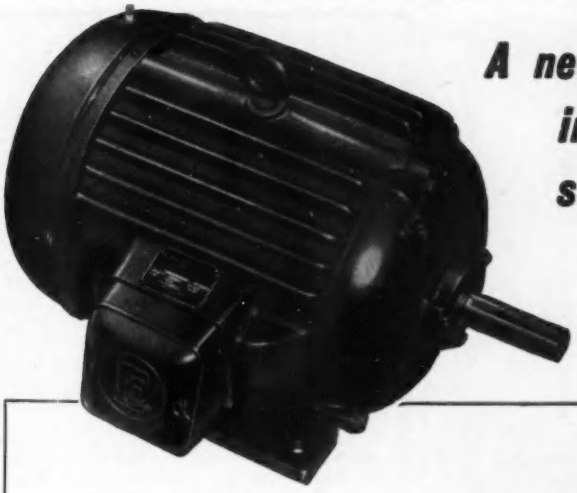
HIGH HEAT MICANITE

1. Maintains its electrical properties at high temperatures.
2. Is suitable for unsupported electrical heating elements such as toasters, surface heaters, all types of resistances and heating elements on domestic voltages where the temperature of the micanite does not exceed 500°C.
3. Is produced in thicknesses up to 0.060": density 2.4 to 2.5. (To ensure adequate mechanical strength a minimum thickness of 0.020" is recommended.)
4. Is produced in flat pieces only (cannot be shaped or moulded).

As the machining of High Heat Micanite requires special facilities and experience, M. & I. prefer to supply it in pieces cut to size and ready for use.

THE MICANITE & INSULATORS CO. LTD., Empire Works, Blackhorse Lane, Walthamstow, London, E.17. BRANCH OFFICES AT BIRMINGHAM, CARDIFF, GLASGOW, MANCHESTER and NEWCASTLE-UPON-TYNE and representatives in most countries throughout the world.

Manufacturers of MICANITE (Built-up Mica Insulation). Fabricated and Processed MICA. PAXOLIN Laminated Materials. PANILAX Laminated Materials and Mouldings. EMPIRE Varnished Insulating Cloths and Tapes. HIGH VOLTAGE BUSHINGS and TERMINALS. Distributors of Micoflex-Duratube Sleevings, Micoflex-Durasleeve (Plastics-covered flexible metal conduit) and Kenutuf Injection Mouldings (in most thermo-plastics including P.V.C.).



A new motor . . . . introducing standardisation

'ENGLISH ELECTRIC' have introduced a new range of totally enclosed fan cooled motors—the LY series—which are made to British Standards and designed to supersede many other enclosures. These motors comply fully with B.S.168 and draft specification CN (ELE) 6814 of the British Standards Institution. Dimensions are similar to those laid down in the American NEMA Standard MG1 - 1949, but for a similar frame size the horse-power outputs are increased to accord with the generally accepted British practice. Frame B.225 is illustrated.

'ENGLISH ELECTRIC'

industrial motors

THE ENGLISH ELECTRIC COMPANY LIMITED, Queens House, Kingsway, London, W.C.2

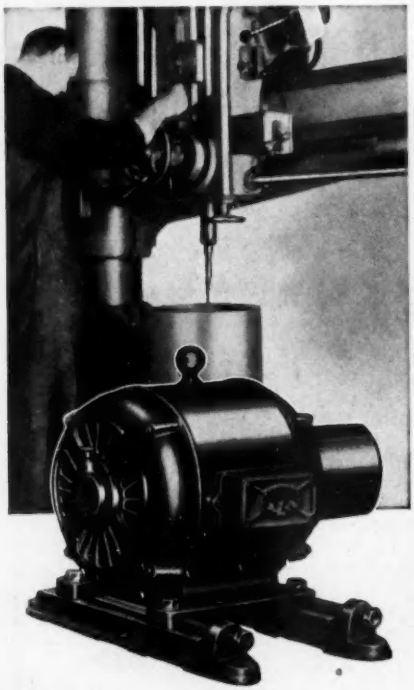
Industrial Motor Works, Bradford

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

BM.5

See the English Electric advertisement for Domestic Appliances which appears on page 17 of this issue.

A



Behind

the motor you buy is a manufacturing organisation keyed to a high pitch of efficiency. More important still, in this particular industry, is the skill of the operatives and the reputation of Howells Motors for lasting, trouble-free service is a reflection of conscientious workmanship. There's more than meets the eye in

POWER BY
HOWELLS
(ELECTRIC MOTORS) LTD
HANLEY · STOKE-ON-TRENT
Branches at:
LONDON · MANCHESTER · BRISTOL
BIRMINGHAM · GLASGOW · LEEDS

dm HE56

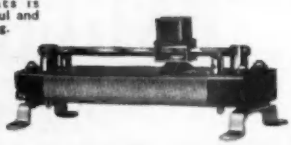
ESSEX
PATENT
FLANGES
FOR FIXING
Electric Immersion Water Heaters, Thermostats, Etc.
to closed tanks and cylinders. Removal of manlids unnecessary. **No soldering.**
Pure mechanical fitting into one round hole.
Sizes: ½" to 2½" B.S.P. threads.
LIST AND TERMS FROM—
ESSEX PARTNERS LIMITED
Manufacturing and General Engineers
67 BRIDGEWATER STREET, LIVERPOOL, 1
Tel: Royal 3481-2 Grams: "Epabos" Liverpool

IT IS A "CRESSALL-PRODUCT"

CRESSALL Rheostats incorporate sound electrical and mechanical principles in design—yet prices are competitive.

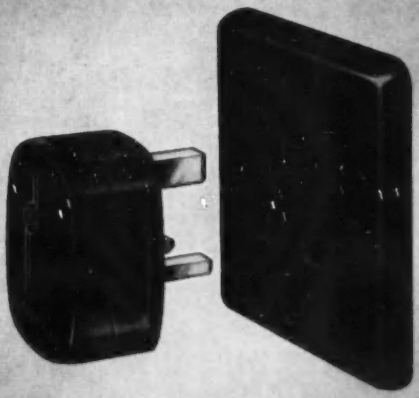
List No. 80 containing data and prices of our standard sliding Rheostats is both useful and interesting. May we send you a copy?

CRESSALL Sliding Rheostat



CRESSALL
Registered Trade Name of
THE CRESSALL MANUFACTURING CO. LTD.
TOWER STREET BIRMINGHAM 19
TELEPHONE: ASTON CROSS 2666 (3 lines)
TELEGRAMS: 'OHMIC' BIRMINGHAM

Electrical ACCESSORIES



13 AMP. SOCKET OUTLET FUSED PLUG TO B.S. 1363

DETAILS ON REQUEST

BILL SWITCHGEAR LTD.
ASTON LANE · PERRY BARR
BIRMINGHAM 20

WHATEVER THE NEED···

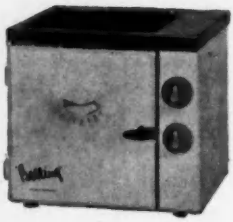
···there is a Belling cooker to suit every home and every pocket whether it's···

LARGE

The BELLING STREAMLINE has 2 boiling-plates and a grill-boiler. The oven is extra large with an inner glass door and interior lighting. Automatic heat control throughout. White or cream vitreous enamel. Price **£49.10.0.** Available on wheels 55/- extra.

The BELLING 47 is easy and economical to use. The full size inner glass door is armourplate and steam free. 2 boiling-plates and grill-boiler. Large warming cupboard. In gleaming white or cream vitreous enamel. Price only **£32.5.0** including simmerstat.

SMALL···OR IN-BETWEEN



The WEE BABY BELLING is ideal for the small home or as an auxiliary where other means of cooking are used. But it will cook a full meal easily, quickly and economically. There's room for three saucepans on top. Cream vitreous enamel. Price only **£6.19.6.**

The BABY BELLING is perhaps the best known of the whole range. A good large oven—almost as large as a full-sized cooker! Large warming compartment. In white or cream vitreous enamel. Price **£13.15.0.**

Have you a stock of these Belling Cookers to meet the demand? They are being extensively advertised and a great many people are asking about them. If your stocks are getting low, please put your order in to us as soon as possible.

you can't beat a "Belling"

BELLING & CO. LTD. BRIDGE WORKS · ENFIELD · MIDDLESEX · HOWARD 1212

CRC 398

In this typical application (a hot strip mill at Stewart & Lloyds Ltd. Corby), motors rewound with silicone-bonded insulation have been introduced.

Where high ambient temperatures and tough operating conditions increase the probability of insulation breakdown, silicone-bonded insulation is the answer. Silicone-insulated motors have **at least 6 times longer life.**

MIDLAND SILICONES

An associate of Albright & Wilson Ltd.

for British made Silicones

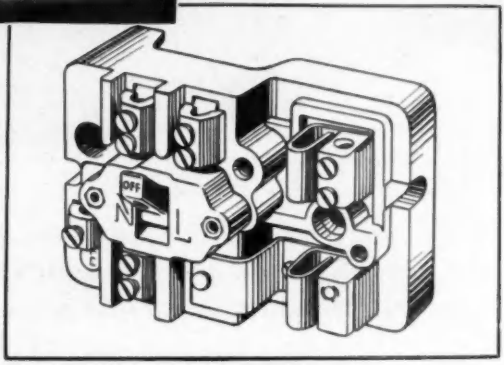
MS MIDLAND SILICONES LTD 19 UPPER BROOK ST · LONDON W1 · *Tel: GROsvenor 4551*

NEW Addition to the Wylex Range—

ONE WAY SWITCH FUSE UNIT

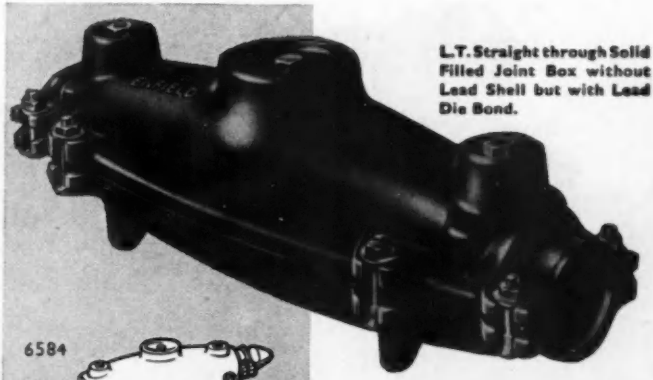
All-Insulated.
The base Unit takes either:— 15 or 30 amp fuses; Rewirable or H.R.C. Cartridge Fuses.

The famous Wylex 30 amp D.P. Switch is incorporated, together with earthing facilities, and the high Wylex quality standards. Easy to install; ample wiring space.



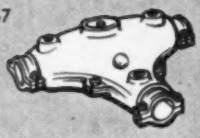
GEORGE H. SCHOLES & CO. LTD.
Wylex Works · Wythenshawe
Manchester

Wylex



L.T. Straight through Solid Filled Joint Box without Lead Shell but with Lead Die Bond.

6584



6567

6550

6534

A selection of boxes from our extensive range is illustrated here.

solid filled underground joint boxes

One maker's straight joint appears much the same as that of another—there *seems* little to choose between them.

However, we at ENFIELD believe that our range offers just that little more to the discriminating engineer—robustness of construction and ample jointing space are just two points that are immediately obvious.

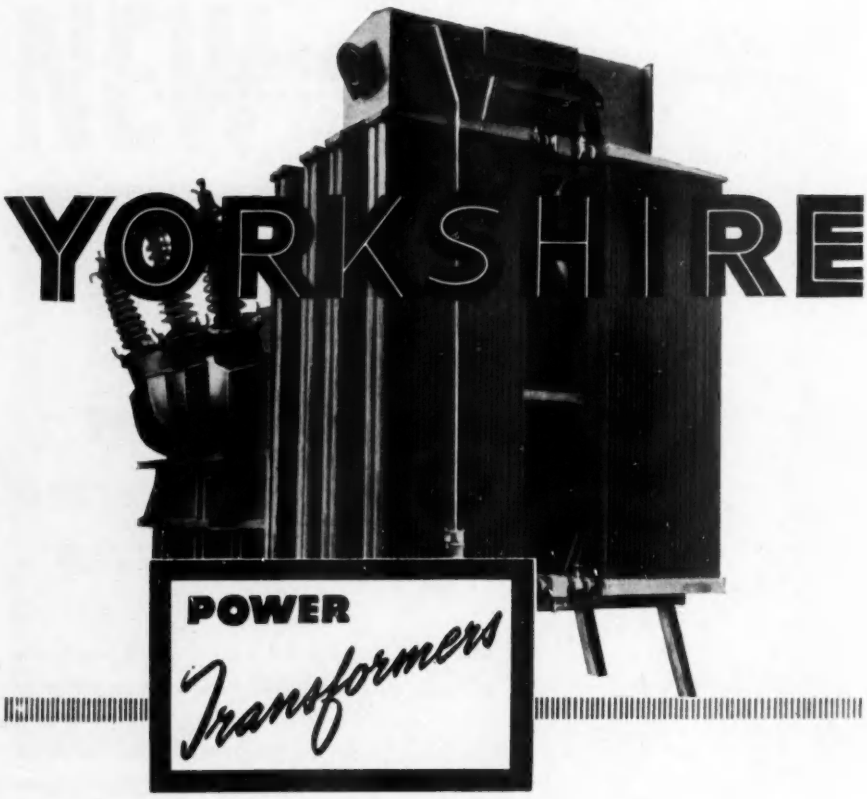
Specify ENFIELD and solve your distribution problems.

ENFIELD

underground disconnecting boxes

Light Engineering and Mains Cable Accessories Department
WEST ROAD, NORTHUMBERLAND PARK, LONDON, N.17.
TOTtenham 6611 (Works) London Office: HOLborn 9292

Enfield



We are specialists in the manufacture of Power Transformers for Generation, Transmission and Distribution. Every transformer is entirely manufactured in our own works. Ratings up to 60,000 kVA. Voltages up to 132,000 volts.

Yorkshire Electric Transformer Co Ltd

THORNHILL, DEWSBURY, ENGLAND Phone: DEWSBURY 1691-2

Famous Scottish Names...

Stewart

Among the many dramatic moments during the '45 one must include the appearance in Edinburgh of Prince Charles Edward, where on September 16th heralds proclaimed James VIII and Charles Prince Regent at the Market Cross. Skirting the Castle, Prince Charles rode through the city to Holyrood Palace amid general acclaim. On his death and that of his brother Prince Henry Benedict, Cardinal Duke of York, the male line of the Royal Stewarts ended. According to the principle of *tanistry*, however, the chiefship of the Royal House passed, through George III and Queen Victoria, to the Royal House of Windsor and thus to our present beloved Sovereign Elizabeth.

Motto: "Nemo me impune lacessit" (no one harms me with impunity).

For Castings in Aluminium Alloys

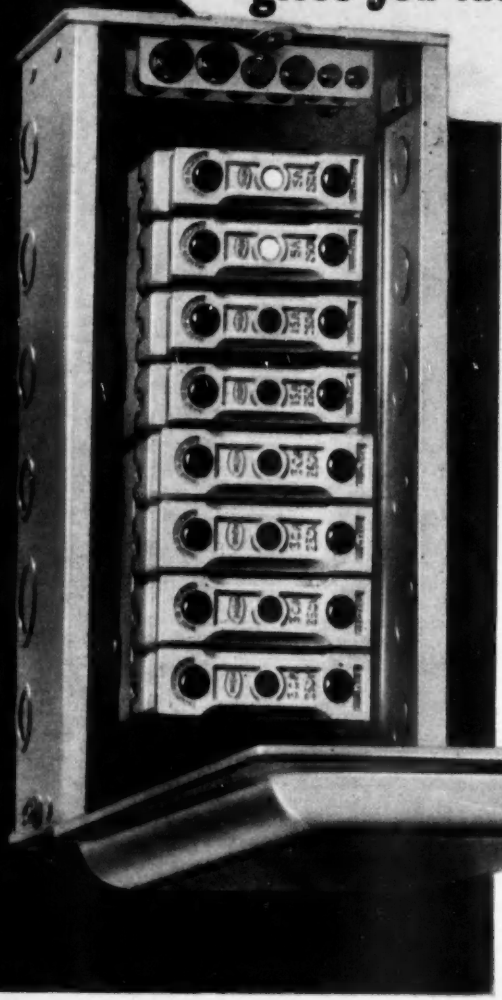
Renfrew Foundries Limited

HILLINGTON, GLASGOW, S.W.2
Telephone: HALFWAY 3391

THE NEW

MEMERA

gives you fuseway flexibility

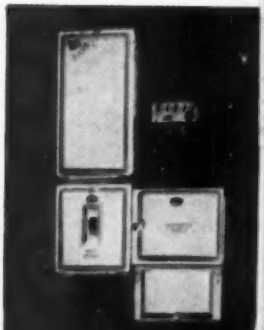


MEMERA Circuit-Fuse Units and Composite Units have been re-designed to offer still greater choice in the rating of the fuse-ways.

By a simple change of the porcelain contact shield each fuse-way may be modified to take 30, 15 or 5 amp. fuse carriers according to the circuit to be protected. The change from one rating to another can be made in a few moments and when the appropriate shield is in position it is impossible for the householder to insert an incorrect fuse carrier.

MEMERA offers you also a choice of cartridge or rewirable fuses in interchangeable carriers in a range of wood cased and metalclad consumers' service units to suit every type of installation.

Send for List No. 319, *which gives full details.*



MEM

Switch, fuse and motor control gear, electric fires and localised lighting equipment

MIDLAND ELECTRIC MANUFACTURING CO. LTD.,
TYSELEY, BIRMINGHAM, 11
Branches in London and Manchester

MAKE YOURS METRO TOO!

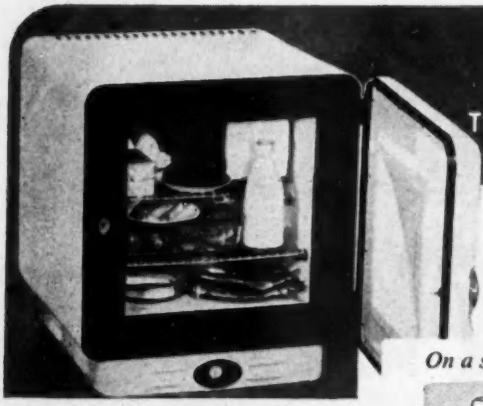
THE METROPOLITAN ELECTRIC CABLE AND CONSTRUCTION CO. LTD.

CLYDE WORKS • CHADWELL HEATH • ESSEX

Tel.: SEVEN KINGS 1810 Grams: METROCABLE

No. 1.A.

B



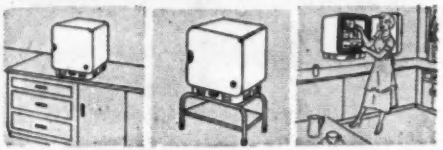
"Astral"

THE SMALL REFRIGERATOR WITH THE BIG MARKET

The Astral brings refrigeration within the means of new millions. It is reasonably priced, small enough for the tiniest kitchen, yet big enough to store all the perishable food for the average-sized family. This Scottish-made refrigerator has swept America and Canada. National advertising commencing shortly will create demand in this country.

Silent, motorless, no interference with Radio or TV. Guaranteed for two years. Measures 24½ in. high by 21½ in. wide by 22½ in. deep.

On a shelf . . . on a stand . . . 'hung' on a wall



Astral REFRIGERATORS

. . . designed for the smaller kitchen

ASTRAL EQUIPMENT LTD., 96 BUCHANAN ST., GLASGOW, C.1.

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the performance of

DALY ELECTROLYTICS is endorsed from

all parts of the world!

The insistent demand for DALY CONDENSERS from the world's export markets—including the dollar area—is rapidly rising. Indeed, during 1952, thirty-five different countries were supplied with electrolytics for a very wide range of products and purposes including electronic and communication equipment, radio, television and motor start.

For over 20 years DALY have made only electrolytics, and their vast experience is at the service of engineers in widely varying spheres the world over. Whatever your electrolytic capacitor needs may be, DALY can supply the RIGHT answer.

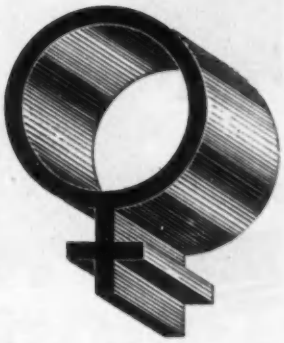
Fully Type Approved to Inter-Service Spec. RCS 134

Descriptive Literature on request.

DALY (CONDENSERS) LTD.

WEST LODGE WORKS, THE GREEN, EALING, W.5

PHONE: Ealing 3127-8-9
CABLES: Dalycon, London



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with the help of the CDA...

Choice of the right grade of copper or copper alloy and its use in the right way saves time, money and material. The C.D.A. exists to help you with expert advice on any of the varied uses of copper and with technical publications, obtainable on application — all free of charge.

COPPER DEVELOPMENT ASSOCIATION

KENDALS HALL · RADLETT · HERTS · TEL: RADLETT 5616

rectifiers for Industry

Please write for Bulletin F/SRT6

Standard Telephones and Cables Limited

Registered Office : Connaught House, Aldwych, W.C.2.

RECTIFIER DIVISION : Warwick Road, Boreham Wood, Hertfordshire
Telephone: Elstree 2401. Telegrams: Sentercel, Borehamwood

'ENGLISH ELECTRIC'

Domestic Appliance Division

Announce

NEW LIST PRICES!

effective with

Direct-to-Dealer Sales Policy

from May 4th

REFRIGERATOR *NOW* £129.0.0
(INC. P.T.)

WASHING MACHINE *NOW* £69.10.0
(INC. P.T.)

The ENGLISH ELECTRIC Company Ltd.

DOMESTIC APPLIANCE DIVISION, EAST LANCASHIRE ROAD, LIVERPOOL, 10

See the English Electric advertisement for Industrial Motors which appears on page 3 of this issue.

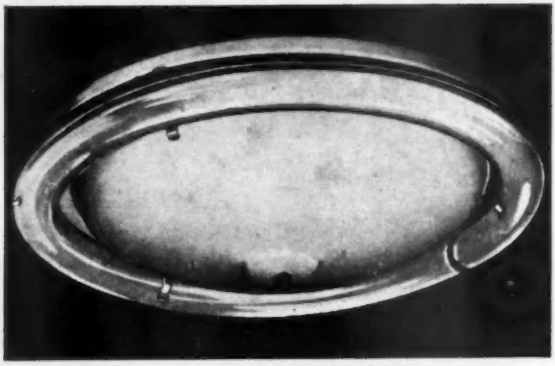
The Fluorescent MORLITE lighting CIRC-O-DISC

An attractive fitting for both home and office use

IN WHITE OR CREAM
CAT. No. FD 8

£3.19.4

PLUS 5/6 P.T.
CIRCULAR TUBE 34/-
PLUS 5/10 P.T.



★ *Generous Trade Discounts*
Illustrated Catalogue showing full range on request

MORLEY'S ELECTRICAL SERVICES LTD.
117 HORNSEY ROAD, N.7 NORTH 4923

The Katholite System of Automatic Emergency lighting

Our wide experience in connection with the installing and operating of Emergency Lighting Systems is freely at your service. We invite you to write for a copy of publication No. D.P. 814 containing much useful information, with circuit diagrams.

THE D.P. BATTERY CO LTD
BAKEWELL DERBYSHIRE
LONDON ... 66 VICTORIA STREET ...

J.249

Another phase in power transmission overseas

301 kV oil-filled cables for CANADA

Pirelli-General Cable Works Ltd. are now completing an order from the Aluminum Company of Canada Ltd. to manufacture and instal a 301 kV. single-conductor oil-filled cable to provide the main feeder from one of two generator transformers to the outgoing overhead line.

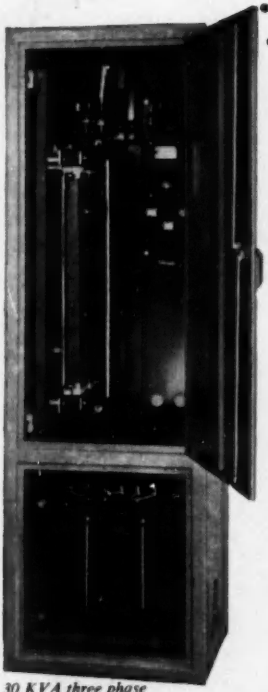
With their vast experience of underground super-tension transmission, Pirelli - General Cable Works Ltd., are in a most favourable position to undertake all types of installations abroad.

PIRELLI-GENERAL *cables*

PIRELLI-GENERAL CABLE WORKS LIMITED · SOUTHAMPTON

BERCO/*B.P.T.*

Voltage Control Equipment



30 KVA three phase cubicle type automatic regulator.

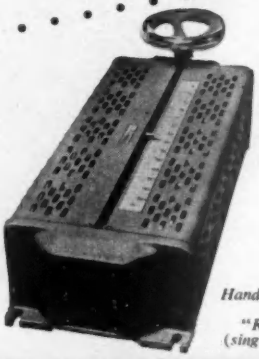
BERCO/B.P.T. voltage regulating and stabilising equipment is designed to afford a constant supply voltage to industrial scientific and electro-medical apparatus — and to all other electrical equipment which is normally sensitive to voltage fluctuation.

Standardised sizes and ratings in single, three phase, hand operated and motor driven models meet most requirements but special designs can be made where necessary.

Complete details and specifications obtainable without obligation.

Please write for booklet 5091.

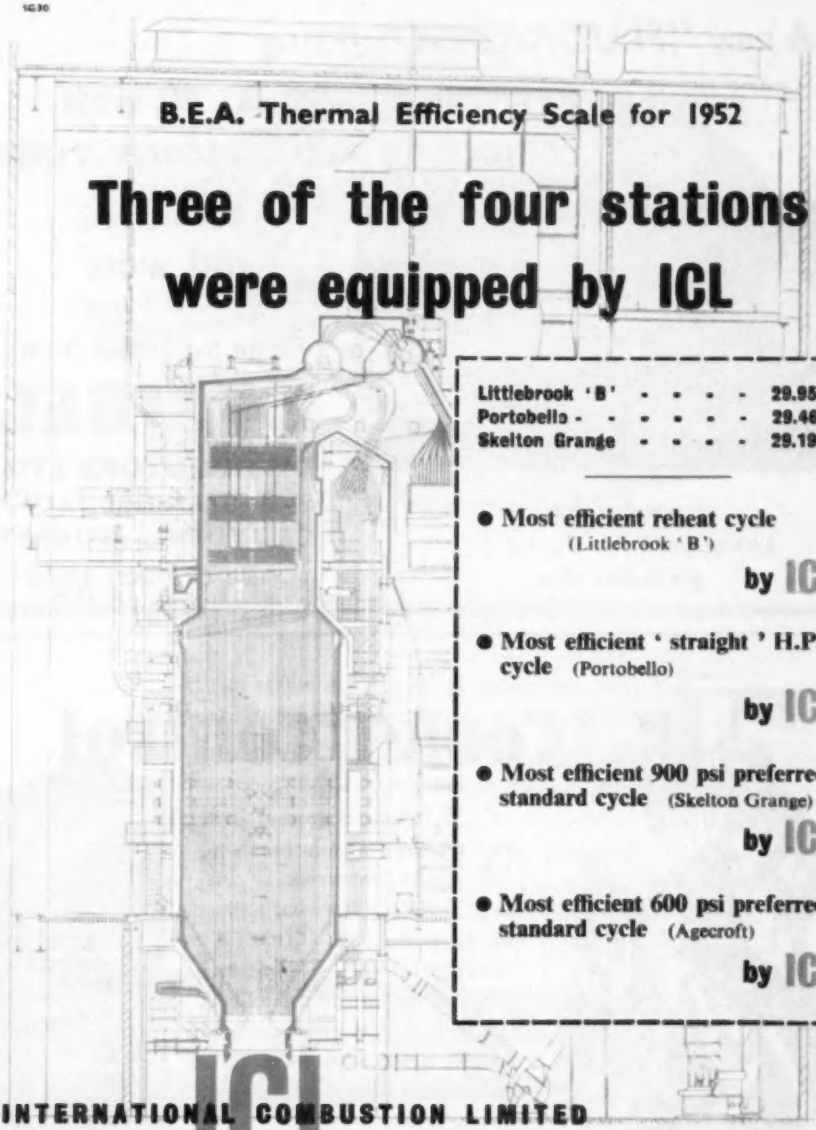
Applications apply to induction heating equipment, electric furnace control, radio and scientific equipment, process control, chemical analysis, X-Ray and electro-medical apparatus, meter testing equipment, and wherever a process depends on a constant supply voltage.



Hand operated BERCO "Regavolt" (single phase).

THE BRITISH ELECTRIC RESISTANCE CO. LTD.
BRITISH POWER TRANSFORMER CO. LTD.
Queensway · Ponders End · Middlesex
Telephone: HOWard 1492 Telegrams: "Vitrohm, Enfield"

BR/BP5091/C



B.E.A. Thermal Efficiency Scale for 1952

Three of the four stations were equipped by ICL

Littlebrook 'B'	29.95%
Portobello	29.46%
Skelton Grange	29.19%

- Most efficient reheat cycle (Littlebrook 'B') by ICL
- Most efficient 'straight' H.P. cycle (Portobello) by ICL
- Most efficient 900 psi preferred standard cycle (Skelton Grange) by ICL
- Most efficient 600 psi preferred standard cycle (Agecroft) by ICL

ICL

INTERNATIONAL COMBUSTION LIMITED

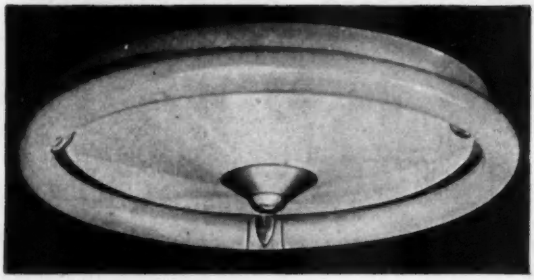
NINETEEN WOBURN PLACE · LONDON · W.C.1

Works: Derby, England; Port Elizabeth, South Africa; Sydney, Australia

A new "FLUORADISC" fitting

suitable for use with the **E.L.M.A.** *40 watt*

CIRCULAR FLUORESCENT TUBE



MODEL 401
List price **£5.3.4.** plus 8/9 P.T.
(excluding tube)

Also available

80 watt

circular fittings.

Send for leaflet from

DRUBEL

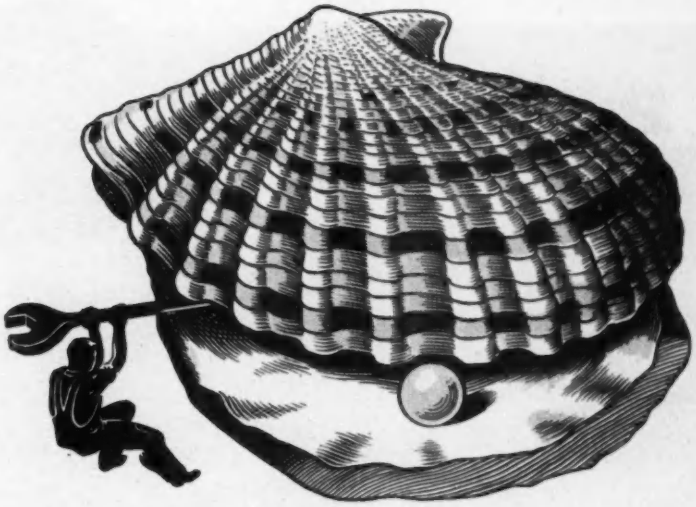
DISTRIBUTORS LTD.
19-21 STAFFORD ROAD
CROYDON, SURREY
Phone CROYDON 1107-8

Cooker Control

NO doubt this was a common enough occurrence in the days of King Alfred, but today we have the D.S. COOKER CONTROL UNIT . . . compact, safe and efficient, incorporating the famous DS Fused Plug and Socket for the kettle and a 30A D.P. switch for the cooker

Leaflet CC/1 tells you all about it

DS **Designed to Serve you well...**
by D.S. PLUGS · MANCHESTER · 5



the pearl in the oyster . . .

. . . it can either choke you or make you rich, depending upon whom you ask to design and manufacture your plastic components. If you ask Metropolitan Plastics (reasonable cost, expert production, prompt delivery) . . .
then you'd better get friendly with your tax collector . . .

METROPOLITAN PLASTICS LTD

have pleased the aircraft, chemical, electrical, railway, radio, stationery, toy and other trades . . . repeatedly

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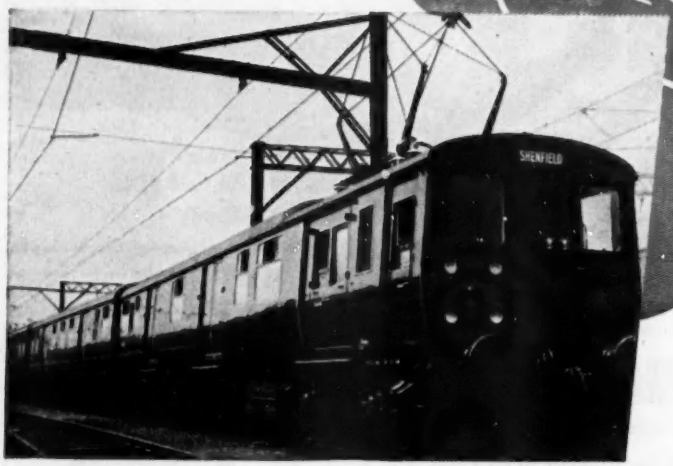

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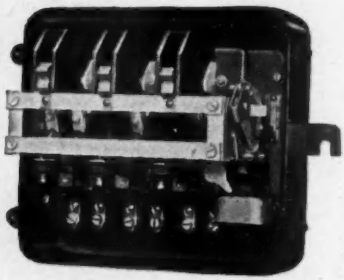

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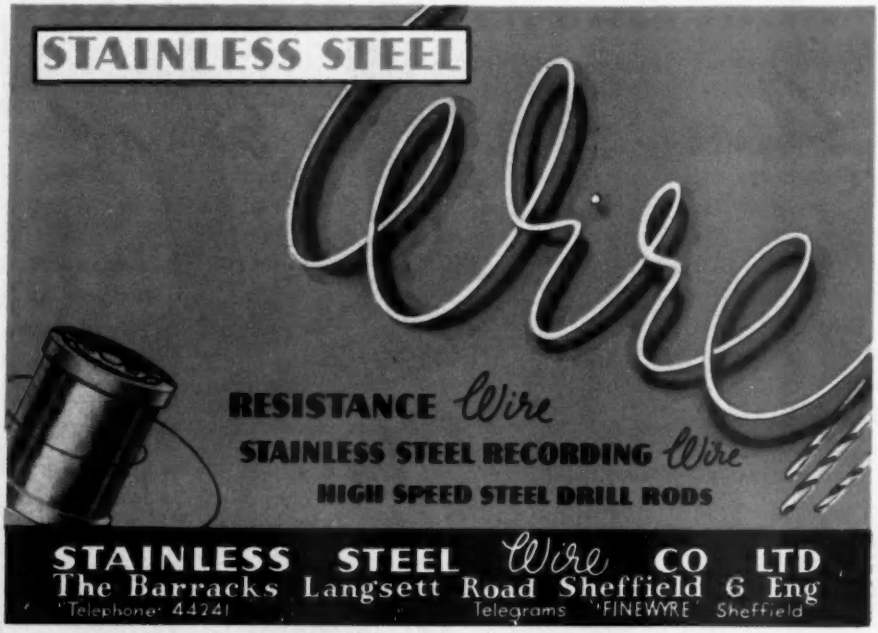

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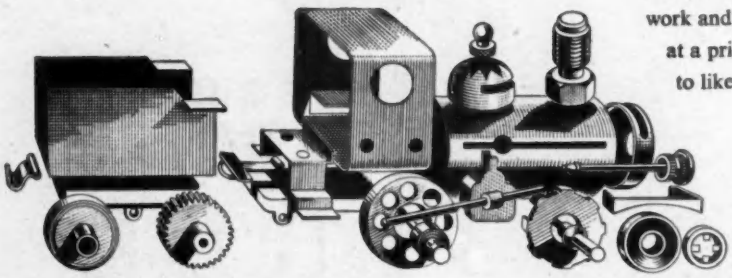

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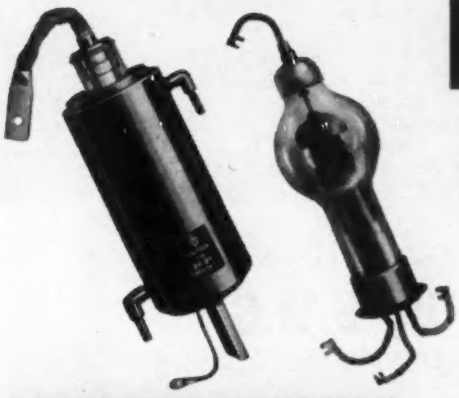

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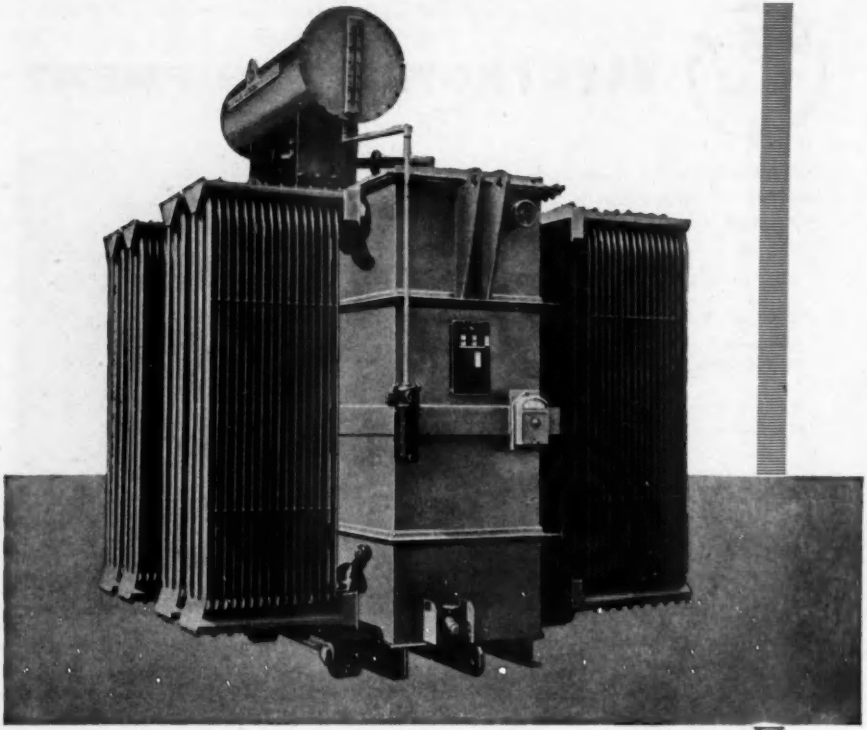

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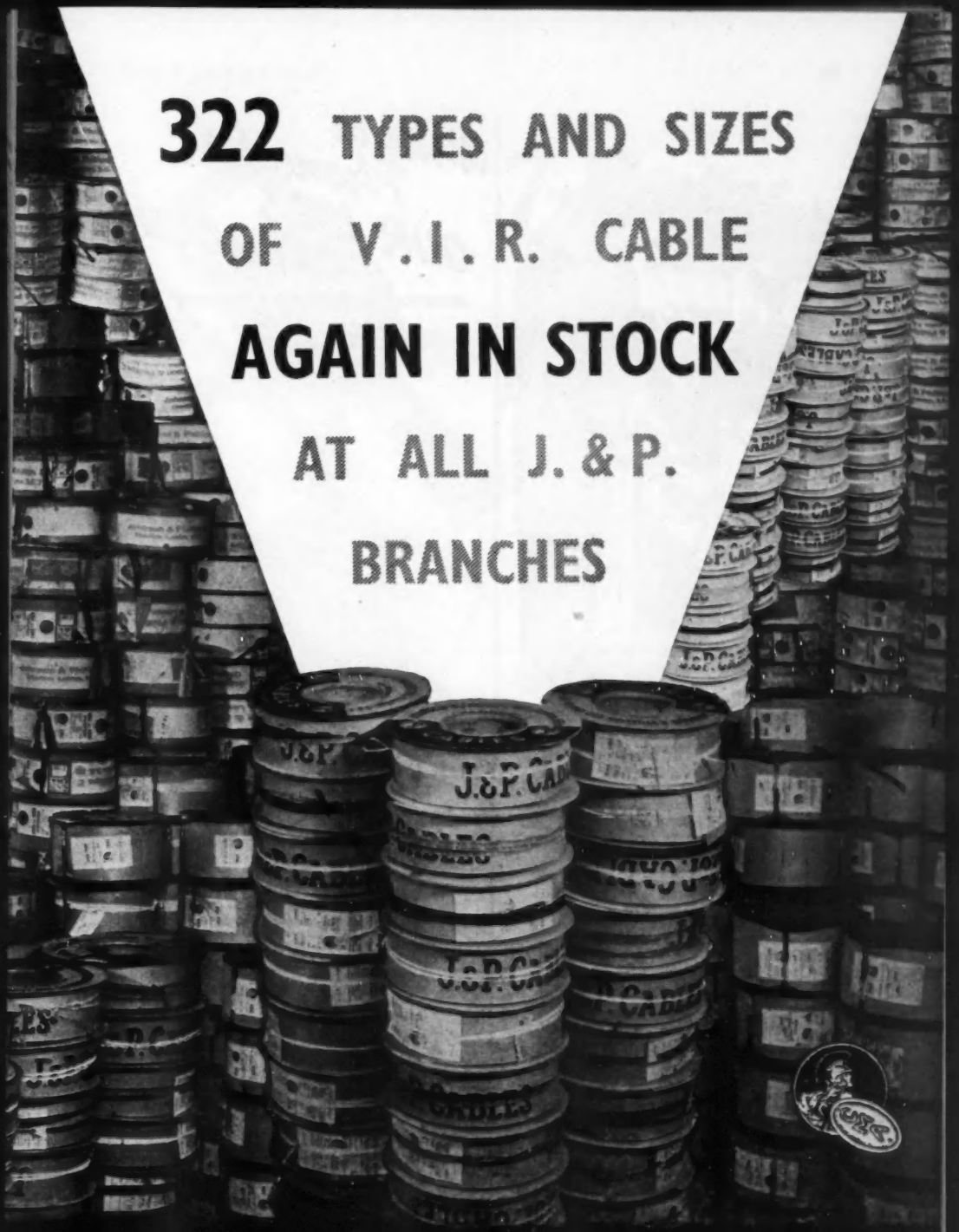

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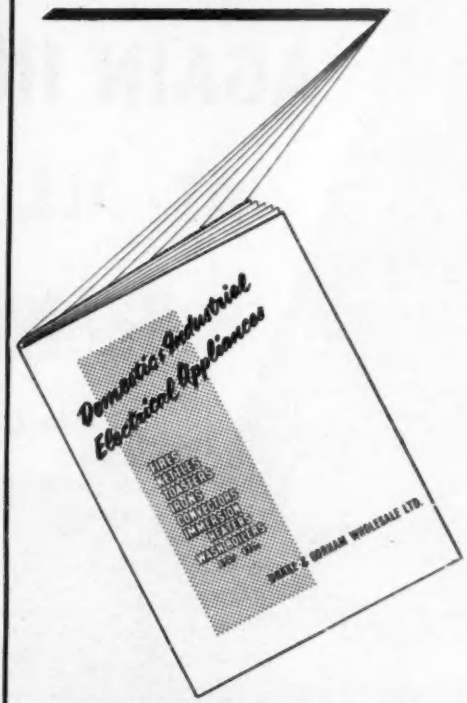

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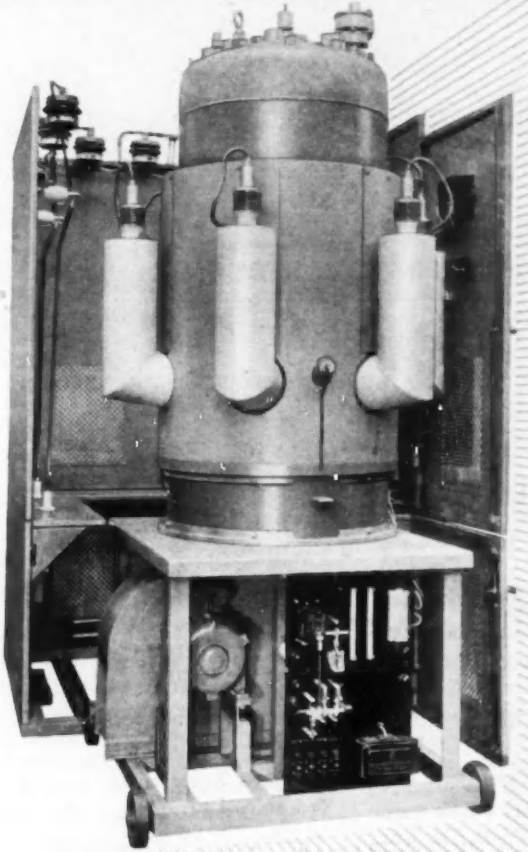

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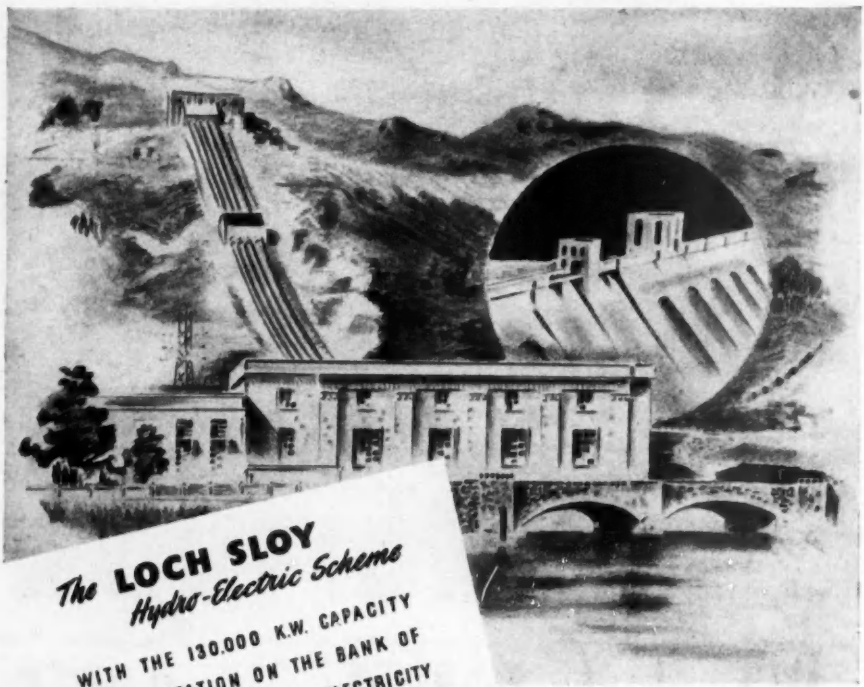

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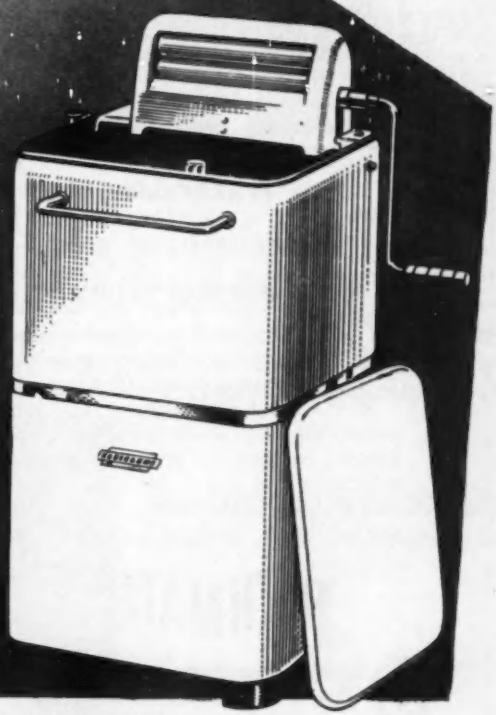

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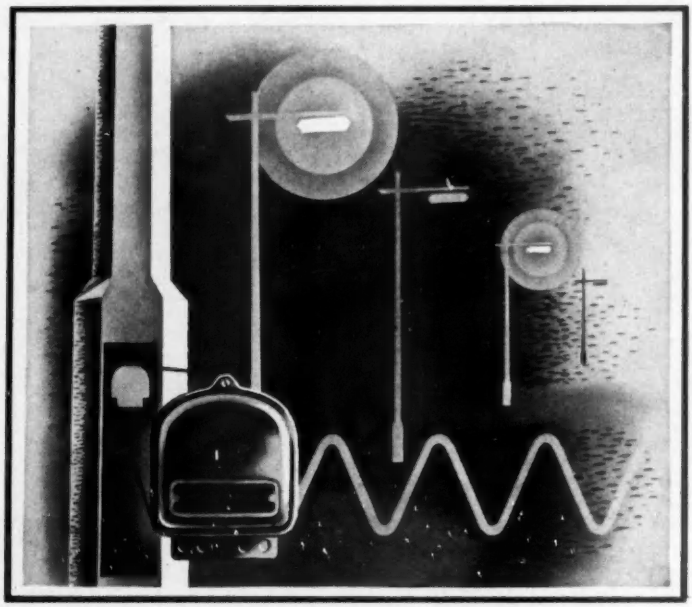

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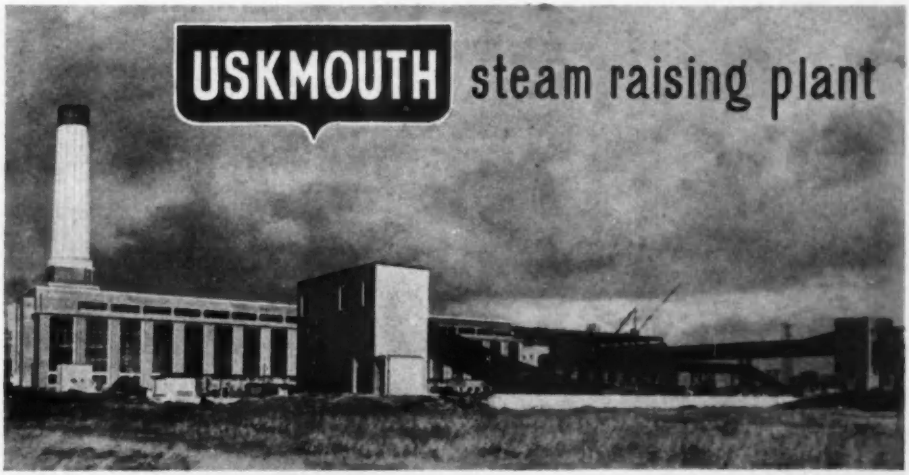

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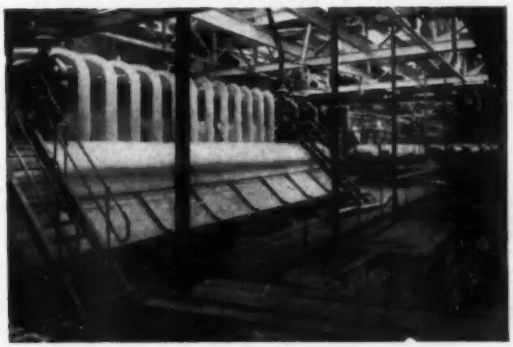

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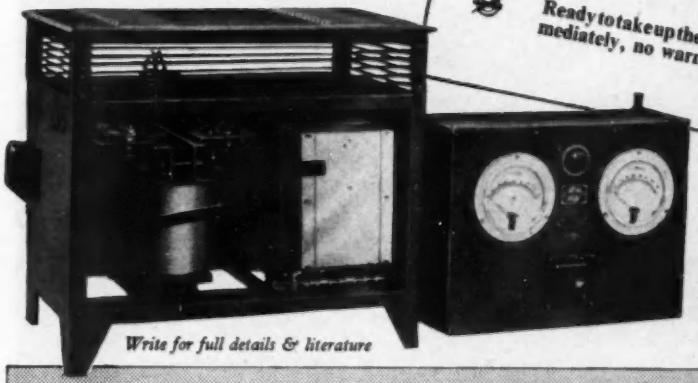

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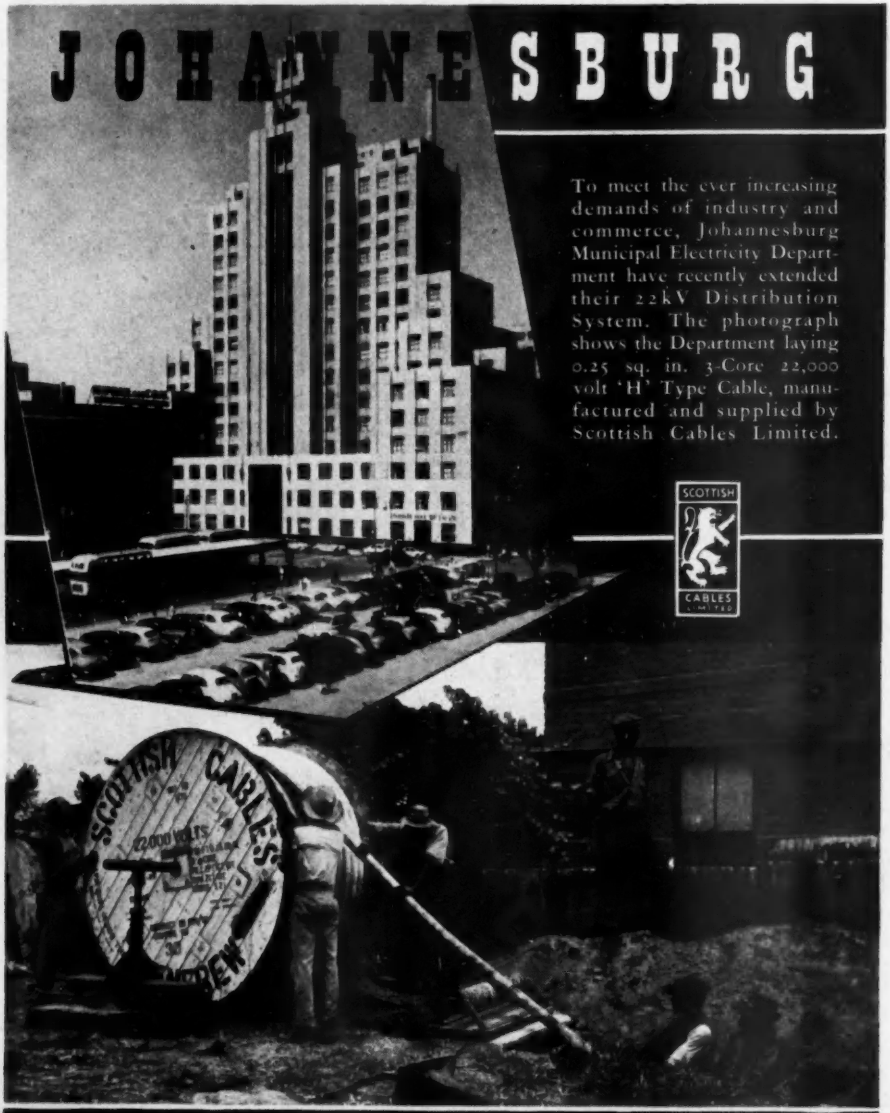

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125	960	Brook	S. Protected	Slip Ring
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110	580	Brook	S. Protected	Slip Ring
100	485	G.E.C.	Protected	Slip Ring
100	580	Westinghouse	Protected	Slip Ring
90	960	Brook	S. Protected	Slip Ring
75	720	Brook	S. Protected	Slip Ring
70	960	Brook	S. Protected	Slip Ring
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55	1,440	Brook	S. Protected	Slip Ring
50	720	Brook	S. Protected	Slip Ring
50	960	Brook	S. Protected	Slip Ring
45	1,440	Brook	S. Protected	Slip Ring
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40	720	Brook	S. Protected	Slip Ring
35	580	E.E.C.	S. Protected	Slip Ring
30	960	B.T.H.	S. Protected	Slip Ring
30	1,440	Brook	S. Protected	Slip Ring
30	720	Crom.-Park.	S. Protected	Squirrel Cage
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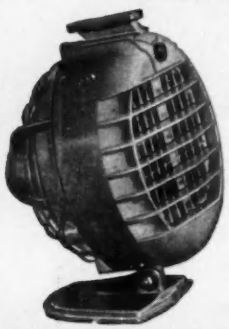

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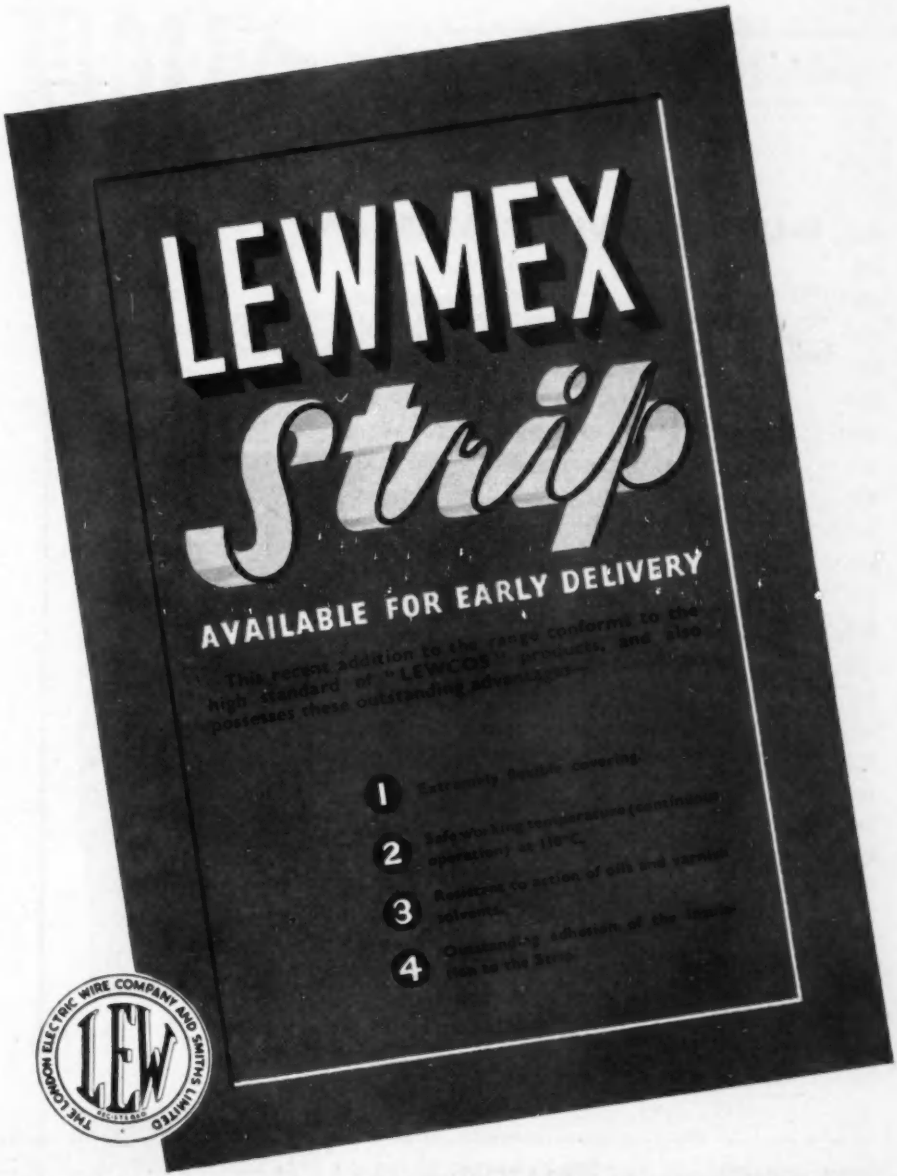

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ELECTRICAL TIMES

Volume 123 No. 3210 14 MAY, 1953

PUBLISHED EVERY THURSDAY

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Editor and Managing Director:
ROY BALDWIN
M.I.E.E., Barrister-at-Law

Assistant Editors:
J. K. JOHNSON
B.Sc. (Eng.), A.M.I.E.E.

K. C. POUNDS
B.Sc. (Eng.), A.M.I.E.E., A.C.G.I.

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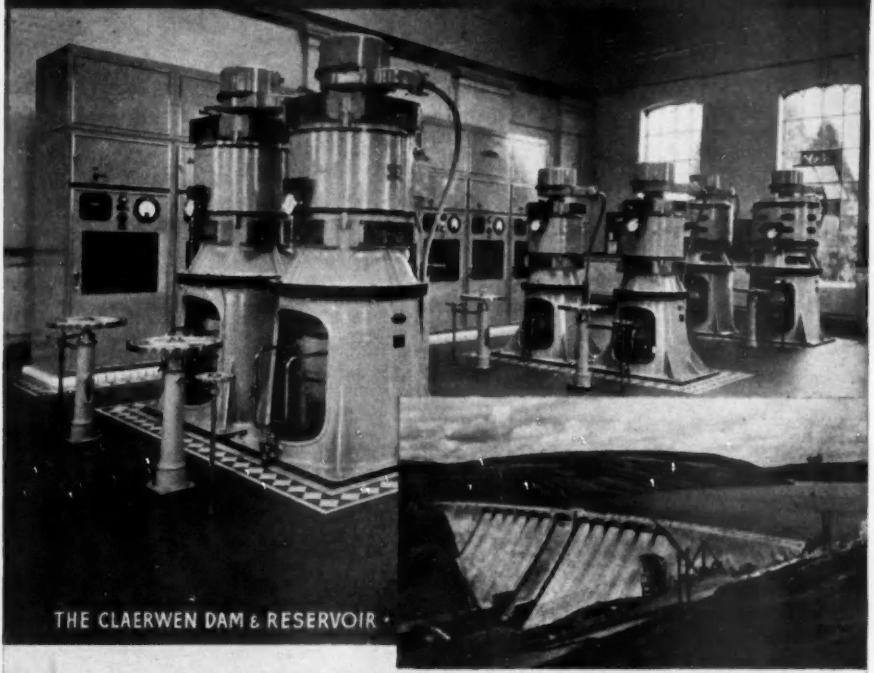

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Editorial

EXPENSIVE DELAY

WHETHER considerations of local amenity should, in any particular case, take precedence over the unquestionable national need for more electricity is a matter for top level political decision. In the case of the proposed power station at Machen, near Newport, Monmouthshire, the Minister's decision has gone against the B.E.A. There is certain to be disagreement with this interpretation of priorities, which results in the loss of the most economical site for a power station which will have to be built somewhere in the area; but the judgment has to be accepted. What this first case of ministerial refusal of consent highlights is a more insidious and continuing source of expense: the delay that is occasioned by present planning and related procedures before actual construction of any power station can start. Two years have been spent—have been wasted, as it turns out—on preparations for Machen. It is quite possible that another two years may elapse before the Minister agrees to an alternative site: or, indeed, until he finally refuses to give his agreement. Two years or more must be allowed for such negotiations in every new power station that is built in this country. Regulations which impose such a delay on urgently required projects are patently too complicated. The fiasco of Machen emphasises that their simplification is urgently required.

RECONDITIONED HOUSES

IS our faith in the benefits of electrical appliances blinding us to the need for more research into their use in the home? Manufacturers may have their development departments, and the B.E.A. their studies of the load curves, but no one seems to be investigating seriously the scientific application of electrical appliances in the home. True, no other competing appliance is so efficient or so easy to use, but this does not exonerate us from ensuring the best possible utilisation from such equipment. The extent to which our competitors are prepared to go in this direction is shown by the purchase of old freehold houses by the Coal Board and two solid fuel appliance manufacturers, in order to gain first-hand familiarity with the problems of modernisation, and to demonstrate exactly what can be achieved with solid fuel. This is part of their bid for the prospective market in the modernisation of some five million existing houses, a task in which electricity, with its flexibility and ease of installation, should be pre-eminent. All too often we have drawn attention to the ground the electrical industry is losing; some improvement may arise when the long heralded publicity programme is put into action, but publicity is not enough, it is only one leg of what should be an all-out individual and corporate effort. In this, a primary place should be given research along the lines suggested, with adequate facilities for ensuring that the householder is fully informed of the latest information on the economical use of electrical equipment in the home. This surely is the first essential of that service to consumers in which the supply industry takes pride.

A.C. AFLOAT

VANQUISHED in the battle of the systems ashore, direct current distribution has for many years remained predominant at sea. Now the trend is against it afloat as well, and the annual report of Lloyd's Register notes that in recent months nearly half of all generating plant for new ships has been alternating current. This shows a tremendous change in a few years, for it is not long ago that an a.c. installation for auxiliary

power purposes was almost unknown. Various reasons have contributed to this move, notably the large tonnage of tankers laid down recently. For such ships the usual disadvantage of a.c., its lack of flexibility in terms of speed of drive, has not been so important, and the experience gained with reliable squirrel cage induction motors under sea conditions gained in such vessels has been encouraging. In the result, adamant problems of speed control are being solved and the future of a.c. on board ship seems firmly assured. The question of standardisation at once arises, and here the Lloyd's Register report offers something of a surprise. The tendency is apparently to fix on 440 V, 3 phase, 60 c/s. It would have appeared more probable at first sight that the standard frequency of the country owning each ship would have been adopted with initial advantages in the cost of motors and control gear. Possibly, however, the early influence of tankers on the evolution of shipboard a.c. systems is exerting an American influence.

SAFE AND WORKING

SERVICE on a comprehensive basis of inspection and repair, with the aim of keeping the consumer free from vexatious and perhaps dangerous breakdowns, is envisaged in one of the papers at this week's E.D.A. Sales and Service Conference. At present the scheme may seem visionary, for experience shows that few consumers are yet willing to pay an annual fixed charge for such a service; but this present difficulty should not be allowed to stop the gradual development of such arrangement, for it offers many advantages to the individual and to the community. Its merits have been recommended before in these columns: besides improving still further the safety record of electricity, it can increase the good will of customers for the supply industry, and can open the door to further sales, both of appliances and of energy. Moreover, it is in keeping with the main stream of progress in the larger field of industrial maintenance. There, emphasis has moved in recent years from the quick execution of an emergency repair to more systematic prevention of breakdown by regular inspection and reconditioning. With the home following industry in the increasing intensity of its mechanisation, there is surely hope that a growing number of customers will see the advantage of regular expert assistance, and will contribute to such service. Whether it is established by an area board or, as is also possible, by some enterprising local contractor, an all-in maintenance scheme will require for its establishment hard selling and an enthusiastic confidence in its eventual success. But it should prove well worth while for both parties in the long run, and eventually it may be able to rely on expansion by consumer recommendation.

CENSUS VALUE

ALL statistics cost money to extract and, as many writers have pointed out, the cost of collecting them can be justified only if the figures are analysed in detail and then used for some valuable purpose. Now the Government has decided to apply this test to the censuses of production which have, in recent years, been annual features of the industrial life of this country. The appointment of a widely representative committee to inquire into the main uses to which the census results have been put will be approved by manufacturers generally, who have regarded the census as another expensive imposition of form-minded Governments. The committee have the prime duty of advising on the future policy regarding the taking of censuses of production and distribution, but if they decide to recommend the continuation of frequent censuses they have the second task of selling to industry their conception of the inquiry as a national necessity. To carry such a point they will have to demonstrate persuasively that an economically full use is indeed made of the figures amassed at so much inconvenience to industry, and that the final census results do not in fact diminish into the raw material for illustrating the teaching of professors of economics.

Meteor

SIDELIGHTS ON STREET LIGHTING

By T. C. Sack
Exterior Lighting Department (General Electric Co).

TO most people, particularly road users, a street lighting installation is taken as a matter of course. Many people think that all that is needed is to dig a number of holes in the pavement, place the base of the columns in the holes, connect up the wiring and the job's finished. In actual practice the planning and installation of main road lighting can be most difficult and complex, and the purpose of this article is to detail some of the troubles which can be encountered in what at first sight would appear to be a straightforward installation. The particular Esher scheme recently completed by the G.E.C. which is dealt with here, is fairly representative of the average installation and is illuminating because of the large number of difficulties encountered. To the street-lighting engineer, most of these troubles are only too familiar, but it is hoped that others may possibly regard their street lighting with more respect in the future. In this connection it is interesting to note how few people know anything about the street lighting even in their own roads. Ask any neighbour (not connected with the trade) as to whether the light outside his house is gas or electric, and in 80% of cases he will not know.

The Site

The associated map—not to scale vertically—gives a general idea of the layout of the Esher lighting scheme. This is located along the Portsmouth Road from the Surbiton-Esher boundary to the junction with the end of the Kingston Bypass—an area known locally as the Silly Isles (*sic*). Over the first stretch of road, shown in the lower part of the map, there is a trolley bus route, which enters the Portsmouth Road shown at the Kingston end and terminates at St. Leonards Road. The district here is mostly urban on the south side of the road, with, at first, reservoirs on the north side and Metropolitan Water Board pumping stations on the south. After a stretch of shops and houses up to Giggshill Green the character changes, being mostly open common on the north side, and occasional houses and buildings on the south. It will, however, be noted that two railway bridges are involved, the first, a straightforward steel structure carries the Southern Region Hampton Court branch, while the second, a brickwork and steel structure at an acute crossing angle, carries the main Waterloo to Portsmouth, Southampton and West Country lines. The angle of crossing is such that the road passes through what is virtually a tunnel—known locally as the Long Arch—which has a headroom of only 14 ft and is of considerable length (some 200 ft). From this point to the Silly Isles, the road is straight and has common land to the north with a few houses to the south.

General view of the scheme to show the railway bridge (not the Long Arch)

The original lighting over the whole of the system, with the exception of the Silly Isles themselves, consisted originally of 150-watt tungsten lamps mounted twelve to fifteen feet above road level on old-fashioned lamp standards of cast iron. The Silly Isles have been, however, for some time well lit by G.E.C. 140-watt sodium vapour lamps in cut-off lanterns in view of the complexity of the road junction and the enormous amount of traffic passing through it.

Despite the proximity of the Kingston Bypass and the headroom restriction on the Long Arch, which precludes the use of double-decker buses, the Kingston-Esher road carries a high concentration of traffic, both commercial and private. It was therefore decided by Esher Urban District Council to install a modern lighting system from the Surbiton boundary up to the Silly Isles. Subsequently, it is hoped to

extend the system through Esher (it is, incidentally, being extended by Surbiton Council to the Kingston boundary by the G.E.C.) in the immediate future.

In order to carry out the first section, specifications of a fully detailed nature were drawn up and tenders invited—the G.E.C. being the suc cessful tenderer for a Group "A" lighting system.

The lanterns chosen are the G.E.C. totally enclosed type with a die-cast light alloy body and sealed-in prismatic Perspex refractor giving smooth interior and exterior surfaces greatly facilitating cleaning.

The leak transformers are of the open protected type with 20 mfd capacitors for power factor correction.

Venner time-switches fitted with solar dials which allow for the variations in lighting-up time throughout the year are also fitted.

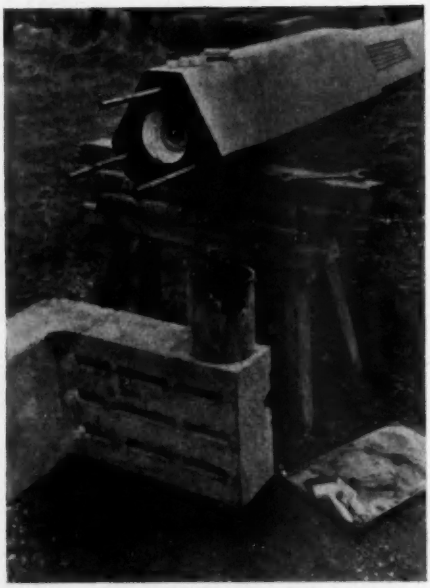
Starting the Job

Initial work having been completed and orders placed, the work of erection was begun at the Western end. All went well until the urban area was reached where the holes dug showed an alarming state of affairs below the pavement. It is always to be expected that some cables and pipes will be disclosed, but on this scheme, as one of the foremen was heard to remark, there "was everything there including the kitchen sink, and the only way was to hang the lanterns from —— skyhooks." Actually closer examination showed that the only thing missing was the kitchen sink! Packed closely together underneath the pavements were the following services: Trunk water mains from the M.W.B. pumping stations and reservoirs; G.P.O. trunk cables; gas mains; e.h.t. cables between Wimbledon and Walton and, of course, sewers. Weaving their way through this conglomeration were all the local house services, electricity, gas, water, together with their own local distribution systems.

In view of the complexity of this underground confusion—and it should be noted that some of the services found were not included on any maps, or where they were shown, in some instances discrepancies were found between apparent and true positions—a temporary halt was called while consultations took place between the contractors, the Council and all the various bodies concerned. A suggestion to Council surveyors may possibly be permitted here. When putting street lighting schemes in urban areas to tender, it is advisable, despite the additional cost, to specify the taking out of trial holes. The actual cost per hole is small and it may well save considerable additional expense (if unexpected obstructions are found) such as having an entire erection gang waiting for instructions and the return of unsuitable columns to the manufacturers.

After these consultations it was decided to take out trial holes on all remaining positions to ascertain the extent and nature of the obstructions and to decide whether normal or cranked roots for the columns could be used, and how they would be fitted in, or whether it would be necessary to move the column position.

Fixing and filling in slots in root (Concrete Utilities, Ltd.)



Cranked root before fixing to standard (Concrete Utilities, Ltd.)

The Silly Isles roundabout showing the existing lighting system

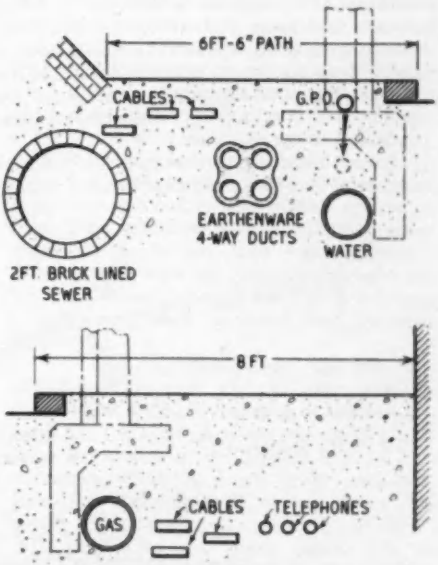
It will be noted from the map that there are 64 lighting positions marked: two of these are located on the wall of the Long Arch, thus leaving 62 positions for columns. In all, over 100 holes were dug—in one position no less than seven were needed before a satisfactory place could be found, and in this case and one other it was finally necessary to alter the position of the kerb line. The ultimate result was that out of 62 positions, only 47 were found where standard roots could be used; the remainder required cranked adjustable roots.

The use of these roots, a Concrete Utilities Ltd. speciality, enables the column to be bolted to an L-shaped foundation root which is placed in the ground in an inverted position. Thus cables, pipes, etc., can pass directly below the column. Normally these foundation sections are placed with the horizontal leg of the inver ted L on the pavement side of the lamp, but in some cases this was found impossible as far as this installation was concerned, and the actual root had to be reversed under the kerbstone out under the road surface.

Siting Problem

Here a few words on the siting problem may be apt. In any scheme using columns mounted on the pavement it is most desirable that they be located at a specific distance, usually about 18 in., from the kerb or roadway margin. This is laid down in the B.S. Code of Practice. It is also essential that the lanterns themselves should be located in the horizontal and vertical planes at a fixed distance from the road edge and surface respectively. This leaves little margin for the contractor to carry out subterranean investigations, particularly as his spacing is also controlled within limits.

In addition, in an emergency in some cases it may be necessary to get permission to position the columns at the back of the pavement instead of 18 in. from kerb edge as originally sited. In these circumstances a different bracket outreach is required in order to keep the lanterns in line and maintain the symmetry of the installation. From this it follows that with the bigger arc of the bracket a shorter column is required—a further argument for trial holes.



These two drawings illustrate the method of using cranked roots. The situation shown was not encountered on the Esher scheme, but actually represents conditions on the Portsmouth Road. The brick sewer, incidentally, is over 100 years old

Erection

Having at last established positions approved by the Council, the work of erection continued. As was mentioned earlier, the route is used over a large part of its length by trolley buses, and over the whole of its length by single-decker buses. The trolley bus terminus is, however, connected by private telephone to the London Transport operating centre, and the wires are carried on the trolley bus poles running along the south side of the road. It had been noticed that it was impossible to erect some of the lamp standards without fouling these wires, and a telephone call to the L.T.E. resulted in an immediate and efficient response. Within half an hour of the call being received, a tower-wagon arrived on the scene, the telephone lines were temporarily moved and the columns erected.

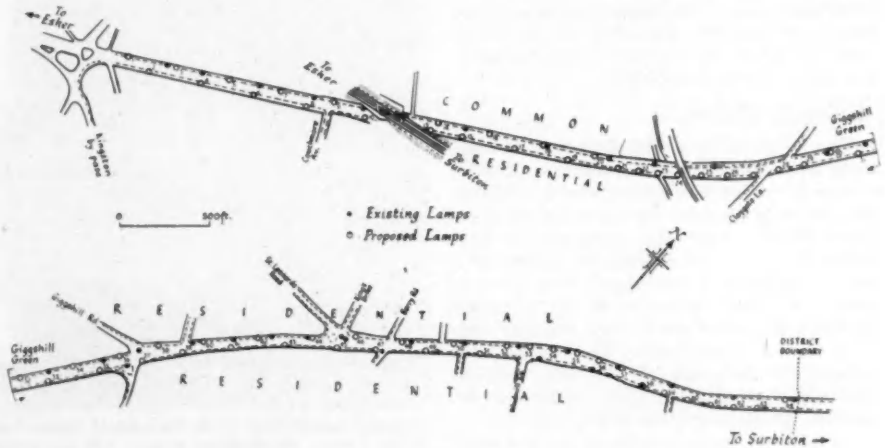
In the Long Arch, with its 14 ft headroom, it was found most important to maintain the same standard of illumination as that provided by the 140-watt sodium lamps mounted at 25 ft height on the roads on either side of the arch. A further factor which complicated the issue is that in street-lighting technique where columns are erected on the pavement, it is desirable in urban areas (where clear definition between roadway and pavement is provided by kerb-stones) to arrange matters so that the lamp overhanging brings the light source as near to the kerb as possible so that the "riser" of the kerb is almost in shadow in contrast to the bright road and footpath which gives a clear definition to the road user.

In the Long Arch, therefore, the lanterns consist of two 45-watt vertical burning sodium lamps mounted in stepped opal diffusing bowls with special brackets designed to conform to the curve of the brickwork. A difficulty in this part of the installation was that a narrow pavement exists only on one side of the road, and secondly that the arch itself is damp and has been faced over the pavement side with corrugated iron to drain off the moisture to a gutter. Despite these troubles a satisfactory solution was found, special brackets being designed to take care of the roof curve, and to position the lamp on the pavement side so that kerb silhouette was maintained.

The Bridges

By one of those unfortunate coincidences which seem to conspire to provide the street lighting engineer with the maximum amount of trouble, the main line from Southampton,

On the right is shown one of the special fittings designed for the Long Arch, and below is given a map of the general route showing the original proposals for the scheme. Note the spacing of the old lamps



On the right is a day view of the scheme, looking westward from the Silly Isles. The Long Arch can be seen in the distance

The night view on the left shows impressively the uniform illumination. The kerb definition is particularly well shown below the first two lamps

Portsmouth and the West changes over from normal signalling to colour light signalling at a set of signals located some 100 yards from the Long Arch crossing. Further, the new lighting system with its 25 ft mounting height brings the level of the sodium vapour lamps above track level. When such circumstances occur, interference with railway signalling has naturally to be considered, and a well established routine comes into operation.

The first thing is to decide the degree of interference which may occur between the lighting and the signals. This is particularly important in the case of sodium vapour lamps which start up on neon, giving a red appearance, and take some minutes to change to yellow, which is practically identical with the standard yellow signal aspect. To establish the degree of interference a small committee—the Railway Sighting Committee—consisting of the Signals and Telecommunications Inspector for the area, and Inspectors from Motive Power (steam), Motive Power (electric) and the Area Traffic Inspector come into the picture. Two representatives from Motive Power were necessary due to the fact that both steam and electric traction use the rail system over the Long Arch, and the signal aspects from a steam and from an electric train cab are quite different. Armed with a special periscope (which simulates the view of the driver or motorman) the committee, together with representatives of the council and contractor, together with a lookout man, red and green lamp, whistle and detonators, proceed after dark along the tracks, examining by the periscope at varying distances, the appearance of the lighting system as it would appear either to the steam driver or to the motorman.

In this particular instance it was found that three lights, Nos. 13, 14 and 24, interfered badly with the colour light signals on the up lines. The contractor, having stationed a tower wagon at the bridges, then fitted temporary screens which were cut and adjusted as called for. In addition the facing sides of the columns were painted black to avoid high intensity reflection.

With this last check over, the job was virtually completed and it was officially switched on during the evening of Wednesday, April 29. The accompanying photographs give some impression of the general level of illuminations, which, as a bus driver remarked, gave him "confidence in driving down that stretch of road for the first time in forty years."

In conclusion the writer would like to acknowledge the help given by the London Transport Executive, the Railway Executive (S.R.), the South Eastern Electricity Board, the Metropolitan Water Board, the General Post Office and, of course, the Esher Urban District Council.

SALES AND SERVICE

E.D.A. Conference Considers the Consumer's Needs

ANOTHER E.D.A. Sales and Service Conference was opened at Caxton Hall, London, on Monday with an address from Dr. P. Dunsheath, the E.D.A. President. In the course of this, Dr. Dunsheath described the conference as the spearhead of development for the most fundamental industry in the country. It was most timely, because the electricity supply industry had been going through one of the most crucial periods in its history. After years of restraint, the shackles were being loosened, and it was his hope that it would not be long before they were removed entirely.

The sales and service experts could abandon their inhibitions and instead of being regarded as merely necessary adjuncts, they would again be in demand. As salesmen they had a service to the country to perform in which they could regain their former significance.

Load Factor Improvement

First paper presented to the conference was "Load Factor Improvement," by W. Gilchrist, A.M.I.E.E., M.I.H.V.E. (C.C.O., Merseyside and N.W.E.B.). After a consideration of the problem in general terms, there is an analysis of the load curves of the various area boards in relation to the national load curve. It is apparent from this that all boards could encourage night loads of considerable capacity. the length of time available varying from eight to twelve hours each night. There is also a valley in the load curve from noon to 4 p.m. Although there has been some dislike of encouraging load in this period, the author considers that in the absence of such encouragement, the valley will tend to deepen, and the load factor will worsen. If this valley were completely filled during the winter, there would be a 55 m unit increase in sales (1½%) and a consequent 1% increase in load factor.

In an examination of off-peak supplies, which follows, the author notes that most of the domestic load is off-peak. Consumers who use electricity for cooking and water-heating in addition to lighting and small power have a group load factor greater than 40%; if the peak component of water-heating were removed, this might well approach 60%. Figures are quoted to illustrate that the incidence of the electric fire on peak may "not be so material as has been indicated by the opponents of radiant heating by electricity."

Space Heating

Mr. Gilchrist considers that continuous space heating is required in at least one room of the average home from October or November to March or April, and he states that the solid fuel fire is the most economical way of achieving this continuous comfort. For between-season heating, however, and for supplementary heating in other rooms, the coal economy of the electric fire has been fully established. The industry should go forward with a definite policy of selling electric fires. For flats, moreover, it is probable that the completely electric building is the real answer to comfort requirements.

Water heating usually has a useful load factor for the supply industry, but where immersion heaters are used in conjunction with back-boilers, the demand peaks badly in morning and evening. Commercial consumers usually have a poor load factor, though there are many commercial consumers who are potential off-peak users of electricity. Properly designed tariffs can help materially to exploit this field, especially if a more sympathetic approach is adopted to the use of load during the midday valley.

Many types of "off-peak" equipment are discussed in the paper. Amongst these are floor warming, thermal storage block heating, and the use of heat pumps. The heat pump is particularly recommended as a source of hot water and of heating services for flats.

One effect of the new standard tariff is to make it possible to offer economic off-peak tariffs which are attractive to the consumer because "on-peak" prices, as reflected in charges for low load factor supplies, have increased.

Data for Development

On Wednesday afternoon the paper read and discussed was a comparison of three industrial sub-areas, compiled by Messrs W. E. Swale, M.I.E.E., A.M.I.C.E. (N.W.E.B.), J. M. Smillie, (N.E.E.B.) and G. L. Tomlinson, A.M.I.E.E. (Y.E.B.). Naturally, such a paper consists

largely of tables setting figures one against another, and in the space available it is possible only to select a few of the many points discussed.

A statistic of the first importance is the average annual revenue/domestic consumer. This was £5·7, £7·5 and £5·7 for the three sub-areas concerned, while the approximate connected loads were respectively 3·3 kW, 3·4 kW and 3·0 kW consumer on average. Actual consumption/consumer was 889, 1,333 and 1,150 kWh/year, the widespread availability of concessionary coal affecting the first figure.

In regarding the revenue shown as disturbingly low, the authors look for methods of stepping it up by increasing appliance sales. They include in their suggestions more effective use of demonstrators; they feel that the demonstrator has not in all cases been given a full measure of responsibility and properly integrated into the *sales* staff. A qualified demonstrator should be given full responsibility under the supervision of the district consumers' engineer for all functions associated with her work.

Service Centres

They further recommend the use of an optimum number of service centres on the basis, small and many rather than large and few. A related field of work is sales development by personnel, other than sales staff and meter readers, who call upon consumers for various reasons. It is felt that the men concerned can help to introduce further business for the boards without invalidating their proper function as service men. The possibilities of introducing more positive incentives for such initiative should be investigated.

After considering some technical details in the recording and handling of statistics, the authors conclude that the production of many sales and accounting statistics can only be justified if they are subject to continual critical analysis; other "needs of the day" which they note are the improvement of load factor by the pursuit of off-peak business; an improvement in salesmanship and also in the economy and efficiency of the sales and service sections; and the imbuing of all employees with the idea "we believe in electricity." On the frequently raised question of incentives they suggest that the best incentives are good working conditions in a safe job. These can be most easily given by an expanding industry.

When it met again on Wednesday morning, the Conference considered a paper by Mr. A. O. Johnson, B.Sc.(Tech.), A.M.I.E.E., (C.C.O., N.W.E.B.). Its subject is the organisation and management of a consumers' repair and maintenance service, and the author gives particular attention in it to the differing requirements of rural and industrial areas.

Degrees of Service

As an absolute minimum, an electricity board must arrange for someone to be available to deal with supply and meter faults. Such a service must operate for longer than the usual working hours, and there must be some arrangement to deal with real emergencies at all times. If such a service has added to it arrangements to deal with consumers' equipment on hire or under h.p. terms, then it may be termed a "partial service." However, a partial service will inevitably entail expenditure on transport, plant and equipment, and this investment may well be more fully used if a "comprehensive service" is established, to deal with consumers' apparatus whether or not it is hired from the board.

Analysis of past records shows that for most districts, calls for attention to appliances show little variation during the year, but that other service calls drop during the summer months, which makes a convenient fit with staff holidays. In rural areas the proportion of calls to mains faults, main fuses and main switches is higher than for urban, as the accompanying table shows.

SERVICE CALLS DUE TO SUPPLY AND INSTALLATION FAULTS, DECEMBER 1952

Class of Fault	Calls per 1,000 consumers		
	Urban	Rural	Rates
Mains faults	0·29	0·70	2·40
Main fuses	1·60	2·00	1·25
Main switch faults ...	0·48	0·80	1·66
Faulty prepayment meter	0·73	0·50	0·69
Consumers' fuses ...	2·20	1·60	0·73
Wiring faults	3·20	3·20	1·00
Total	8·50	8·80	1·04

Calls for service in the case of "all-off" and "shock" complaints must be given precedence, and arrangements must be made to meet them. The scheme adopted for dealing with other calls can vary greatly with the type of district. In densely populated districts where the number of complaints of every kind is large, it is possible to employ men on repairs of one specific type. This eases store-keeping and administrative work, as the men concerned need be equipped with only a limited range of spares. "First aid" coverage is given from early morning to late evening by men acting purely as a "fuse squad."

Rural Districts

In districts which are largely rural, service men have to be based on towns which are population centres for the area. Jobs are issued in small numbers so that the man returns to the working centre two or three times daily. Service men in these districts carry out all types of work. An after hours service is provided by personnel from centres which are in any case manned all the time, such as generating stations, rotary sub-stations or report centres. In sparsely populated areas, where the incidence of faults is so low that employment of a man on shift stand-by is not justified, arrangements are in existence for service men to be on call in their own homes.

In the more crowded districts the emergency man only clears the fault and restores supplies, leaving permanent repairs to a second man, thus becoming available again as soon as possible. In outer districts, where travelling takes up much time and transport costs are high, the service man carries out on site all repairs short of major rewiring.

This question of transport again assumes an important role in deciding where repairs to appliances should be carried out. In general, the standing time of vehicles should be kept to a minimum, and so replacement parts should be used rather than a repair attempted on site. To back up service men a central workshop is necessary, and to ensure a sufficient flow of work for this it may have to be established at sub-area or even area level. The specialisation which such centralisation makes possible has to be balanced against time delay in returning the appliances.

Organisation

Consumer service of the type described in the paper is best operated, except in the smallest units, separately from the electrical contracting work, as different management techniques are necessary. In the N.W.E.B. most districts have a "service engineer" responsible to the district consumers' engineer for both servicing and contracting. The two sections, however, are divided, with either an assistant engineer or a foreman in charge of each.

Looking to the future, Mr. Johnson considers ways in which the fullest service can be given with the least complication to the consumer. One approach may be to provide for periodic inspections of wiring and equipment of sufficient frequency to ensure that breakdown is rare. However, although such a service could be offered at a fixed annual charge, experience so far indicates that only a small proportion of consumers are prepared to meet such a charge. It is not possible to run such a scheme economically unless a large number of consumers participate.

An alternative method is to provide service without a separate charge, and experiments on these lines so far as fuse repairs are concerned are being made by the N.W.E.B. Because the cost of billing and collecting a small charge is avoided, it is considered that little extra expenditure is involved. An extension of this service to consumers' installations and appliances might be possible eventually, the cost being charged as a concealed amount in the tariff. Such a development might lead to the need for a specially selected type of service man who will be able to carry out any type of electrical work on the consumer's premises, and who will also act as the main contact between the board and consumer.

Industrial Developments

Wednesday's second paper was concerned with recent developments in the industrial field. The author was Mr. D. G. Gwyn, B.SC., A.M.I.E.E. (S. Wales E.B.). His paper discusses at some length the problems associated with large industrial loads. The first special requirement met with is the provision of duplicate supplies as a minimum guarantee of continuity. Sometimes triplicate or even quadruplicate feeders are considered essential. Such delivery of large loads by multiple circuits results in very high short-circuit fault levels. Because of this, and in spite of the use of high reactance transformers to step down the supply to works distribution voltages, consumers engineers are finding their layouts increasingly conditioned by the cost of providing adequate protection. This problem is underlined by the costs noted in the accompanying table.

APPROXIMATE COST OF SINGLE UNIT STANDARD O.C.B.s

Rupturing Capacity	11 kV	6·6 kV
150 MVA, hand operated ...	£440	£420
250 MVA, hand operated ...	£560	£600
350 MVA, solenoid operated ...	£1,100	£1,700
500 MVA, solenoid operated ...	£1,720	£3,250

Power factor considerations also loom large in the problem of supplying industrial demands. An interesting aspect of this problem is that while continuous unity power factor would appear to be the ideal economic condition, it is not always technically advisable. In one case it was found that a neighbouring base load station would be adversely affected if a 35 MVA load exceeded 0·95 lagging.

This paper concluded with some examples of the utilisation of electricity in large works.

ADMINISTRATIVE capital of the Union of South Africa, Pretoria has a European population of 130,500 and a non-European population of 99,500. Although the city boundaries enclose an area of 72 square miles the Pretoria electricity undertaking in addition serves an area of 1,500 square miles—the largest supply area of any local authority in South Africa.

In September 1944, the City Council, as the first step in a programme of post-war reconstruction and development, approved the construction of a new power station, the "B" station, with an ultimate capacity of 180 MW. At that time the capacity of the "A" station, which has been in existence since 1923, amounted to 58 MW, but was subsequently increased to its present-day capacity of 85 MW.

Local authorities in South Africa require the approval of the Provincial Administration and, presently, also of the Union Treasury before incurring capital expenditure. Approval of the construction of the "B" station was received in August 1945 and the first contract was placed in November of the following year. The expenditure authorised for the complete station is £9,302,000.

Plant Installed

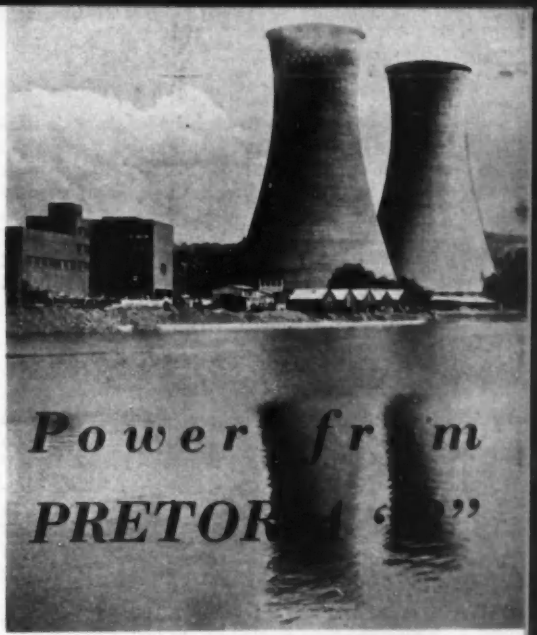
The new station has been placed adjacent to the "A" station and has been planned for six 30 MW, 3,000 r.p.m. turbo-alternators and ten 210,000 lb/hr stoker-fired boilers. The first set was started up in July 1952 and two sets and four boilers are now in commission. Work is proceeding on the installation of the third machine and boilers 5 and 6, whilst contracts have been placed for the 4th set and 7th boiler. The steam conditions are 625 lb/sq. in. and 825° F at the turbine stop valve.

The consulting engineers are Messrs. Merz and McLellan who associated themselves with Messrs. F. E. Kanthack and Partners for the civil engineering works.

Buildings

The first portion of the station to house three sets and six boilers has been completed and tenders will shortly be invited for the remainder of the buildings. All buildings are of reinforced concrete framework, clad in brick. A reinforced concrete, instead of a steel-framed structure, was adopted on account of anticipated difficulties and delays in obtaining heavy steel sections.

The boiler house is parallel to the turbine house with a central bunker bay and firing aisle. There is no division wall between the turbine and boiler houses. The boiler plant has been



The new station now in operation is described in this article

supplied and erected by Messrs. Yarrow (Africa) in association with their parent company in Scotland.

The boilers are of single gas flow three pass design with water-cooled Bailey block-covered walls and are fired by twin travelling grate stokers 14 ft. wide by 20 ft. long. The boilers are equipped with unified boiler control, automatic sequence soot blowing and coal weighers mounted on travelling rail carriages arranged for transportation over any of the boilers.

Turbo-Alternators

The turbines are two-cylinder machines exhausting into twin condensers. Feed heating is through a direct contact de-aerator heater and three H.P. heaters to 340° F. at economical load. Each turbine has two fully rated extraction pumps and two main air ejectors with one quick-starting ejector. The alternators each have two half-capacity ventilating fans and air-coolers and the exciters are direct driven. The generating plant is of English Electric manufacture.

Water Treatment

Feed make-up water is taken from the town mains to a hydrogen-ion sodium base exchange blend plant rated at 6,000 g.p.h. and passed to the evaporators. A chemical injection pump

with connections to each boiler drum is provided for boiler water conditioning.

Three reinforced concrete cooling towers have been provided for an installation of 157·5 MW which includes the 37·5 MW "A" station load and provision is made for two more. Each tower will cool 2,500,000 gallons of water per hour. Filtered sewage effluent is used as make-up water.

Switchgear

Energy is generated at 11,000 volts and transformed for transmission purposes to 33 kV by a 35 MVA step-up transformer connected solidly to each generator terminal. Main switching is carried out at 33 kV. The 33 kV switchgear is Reyrolle indoor metalclad compound-and-oil filled type with a breaking capacity rating of 1,500 MVA. The 3 kV and 415 volt switchgear for station auxiliaries is of the indoor air-insulated air-break type supplied by English Electric.

Over the period that the plant has been in operation the optimum overall thermal efficiency over a period of one month has been 26.0% on units generated.

The total installed capacity of the "A" and "B" stations stands at 145 MW and will be increased to 175 MW when the third set is commissioned later in the year. The maximum demand on the station has been 120 MW "half-hour average".

Trading Results

For the last financial year (June, 1952) the Undertaking sold 434 million units at an average price of 0·767d/kWh. Working expenses amounted to £683,730 (0·378d/kWh) and capital charges to £602,845 (0·333d/kWh). The year's working resulted in a nett profit of £100,191.

Units supplied to domestic consumers were 147 million at an all-in price of 0·94d/kWh, and those domestic consumers with electric water heating installations, having the advantage of the Undertaking's special tariff of 0·25d/kWh plus 15% for this service reduced their all-in expenditure on electricity to an average of 0·71d/kWh.

It should be noted that no restrictions as to hours of use are in force in connection with the supply for water heating.

C.I.G.R.E. in London

A FULL and entertaining week was spent by the members and delegates of Study Committees Nos. 6 and 7 (Bare Conductors and Mechanical Calculation of Overhead Lines, and Transmission Towers and Tower Foundations) when they held their London meeting from May 4 to 9.

The extensive programme arranged began with the meeting of Study Committee No. 6 at the B.E.A. on Monday, followed on Tuesday by a trip down river to Tilbury to inspect the Tilbury-Brentwood section of the 275/380 kV line. On Wednesday, after a meeting of Study Committee No. 7, the delegates travelled to the B.E.A. Research Station at Leatherhead where they saw much of the work being done, and had the opportunity to visit the experimental e.h.v. line.

Reception and Dinner

In the evening of Wednesday, a reception and dinner was held at the Piccadilly Hotel, where Mr. and Mrs. P. V. Hunter received the guests. Mr. Hunter, proposing the toast of the Guests, warmly congratulated Prof. Giovanni Silva on his election to the Council and the position of honorary vice-president. He welcomed the guests and was pleased to see the support given by the I.E.E. by the presence of Col. Leeson, and also of the B.E.A. by Sir John and Lady Hacking. As chairman of Painter Bros., he regretted his inability to be present when, on Friday, delegates would have the opportunity of seeing the transmission tower work at Hereford.

Mr. J. Tribot Laspiere replied on behalf of the Guests, and referred to Mr. P. V. Hunter's long association with C.I.G.R.E. He also remarked on the hard work and the amount of time put in by Mr. R. A. McMahon, secretary of the British National Committee in connection with C.I.G.R.E. matters. Prof. Silva also spoke and Mr. McMahon was persuaded to make two speeches, one in English and one in French, in which he thanked Mr. J. Tribot Laspiere for his kind remarks.

On Thursday, the party visited the Birmingham Section of the B.I.F. and stayed overnight at Hereford. The following day was devoted to a visit to Painter Bros., Ltd., where a tower was shown under test, and the party, after staying overnight in Oxford, returned to London on Saturday.

Representatives of France, Finland, Germany, Italy, Palestine, Sweden and Switzerland were present.

Overhead Line Construction

The choice of conductors, the choice of span, and the design of cross arms for wood pole lines are described by a contributor

Part Two

IN the case of wood pole lines using single poles the choice of span is likely to be decided by the strength of the pole and the spacing of the conductors.

The "wind loading" span will be fixed by the strength of the available poles. Here some economic considerations may arise as heavier poles may be available but their extra cost may outweigh the gain in span length. For the higher voltage lines this is unlikely to be the case as the cost of insulators and cross-arms will represent a higher proportion of the total support cost.

Having decided upon the "wind loading" span, this or the span just below it corresponding to a standard pole height and the desired ground clearance, becomes the normal span to aim at in line design. Where particular circumstances require it, longer spans can of course be used provided either both adjacent spans are correspondingly reduced (so that the total wind load transmitted to the pole does not exceed the limit), or specially heavy poles are available.

Cross-arms for Wood Poles

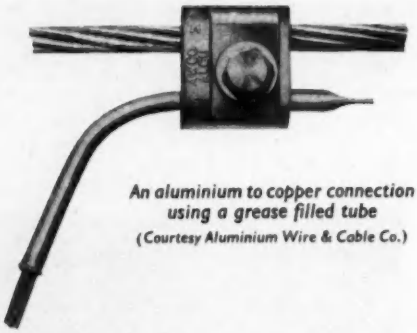
Span length and conductor spacing being decided, the cross-arms can be designed. The design of steel towers is outside the scope of this article and we shall confine ourselves to considering the fundamentals of design of wood pole cross-arms.

The effect of 'uplift' is shown in the photograph of lines over hilly country (E.D.A.)

Cross-arm supporting braces may be designed either as struts or as ties, but the former is more usual and will generally be more economical as the bending stress in the main member will be less. This will be obvious from a consideration of fig 2. If the brace is a strut, the maximum Bending Moment on the main member is either Wa at "A" or Wb at "B," while if the brace is designed as a tie any support derived from it on the load side should be neglected and the maximum B.M. is at "B" and equals $W(a+b)$. Generally a and b will be approximately equal and thus the main member need only be about half as strong in the former case as in the latter.

It is usually considered undesirable to use flat bars as struts, though the designers of the light lines covered by B.S.S. 1320 have used flat bars which are twisted so as to increase their rigidity. The effect of the twist is to reduce the unsupported length in any plane and thus approximately to halve the "slenderness ratio," i.e. the ratio of unsupported length to least radius of gyration.

For heavier lines, however, angle-iron braces are usual. The safe load tables produced under the auspices of The British Constructional Steelwork Association and the British Steel Makers give permissible loads for struts made from single or double angles and for single or double bolt fixing. If it is felt that these tables are prepared to meet an unneces-



An aluminium to copper connection using a grease filled tube
(Courtesy Aluminium Wire & Cable Co.)

sarily high factor of safety for overhead line construction, the designer can readily enough work out his own sizes.

It is important that the shear and bearing pressure at the fixing bolts should not be overlooked. Here again the safe load tables provide conservative figures which form a useful guide to the sizes of bolts which should be used according to the load and the thickness of the members through which the bolt passes.

While the regulations (El.C. 53) are explicit that a factor of safety of $2\frac{1}{2}$ must be applied to the elastic limit of tension members and to the crippling load of struts, it is not clear whether it is intended to apply the factor to the elastic limit in a main cross-arm member, the stresses in which are principally due to bending and shear. Designers may well feel that in such a simple structure, if abnormal loading should result in the member taking a permanent set, no very serious consequences will follow, and that the member can be replaced or even straightened.

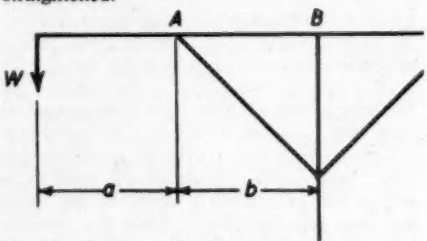
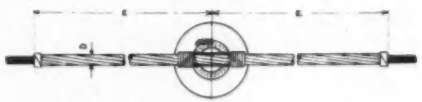


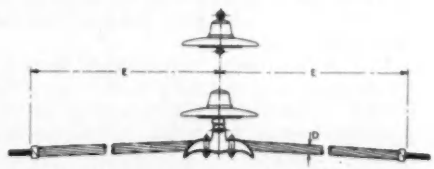
Fig. 2. Sketch to illustrate stresses in cross-arm and braces

Main members of intermediate pole cross-arms of wood pole lines are usually formed from a single channel or angle iron. An arrangement with conductors in horizontal formation on a single angle iron cross-arm supported by struts (as in B.S.S. 1320) is very popular and economical. In considering the strength of such an arm it is as well to remember that an unsupported angle iron mounted with one leaf vertical and loaded in a plane parallel to that leaf is subject to unsymmetrical bending.

The section moduli Z_x and Z_y given in the tables do not apply to such a member. The "principal axes" "U" and "V" are inclined to the "X" and "Y" axes (parallel to the leaves) at an angle which is given in the tables. Readers who wish to pursue this matter further are referred to standard works on the Theory of Structures[6]. The effect of this dissymmetry, however, is to reduce the strength to about 75-80% of that calculated from the tabulated modulus Z_x for an angle mounted with the "X" axis horizontal. If the member is to be designed with the factor of safety based on its ultimate strength it is obviously much more important that this effect should not be overlooked. Allowance should also be made for the effect of bolt holes unless these are on the neutral axis—which will not generally be the case.



Straight rods in position for pin insulators



Straight rods in position for suspension insulators. The use of rods to prevent vibration is illustrated in these drawings
(Courtesy of Aluminium Wire & Cable Co., and the Aluminium Laboratories Ltd., Kingston, Canada)

Cross-arm Loading

Some difficulty may be experienced—particularly in the case of intermediate pole cross-arms—in deciding on a suitable loading for which the arm should be designed. This will depend not only on the span length, the size of the conductor and—in the case of pin insulators—the height of the insulator, all of which can be determined, but also upon the type of country, i.e., flat, hilly or mountainous. It is also necessary to decide whether one size of cross-arm shall be maintained for all lines of a particular type which shall be strong enough to meet the worst loading anticipated or whether two or more sizes shall be available.

There are obvious advantages in having only one size from the point of view of initial construction, and perhaps even more from that of storekeeping and maintenance. On the other hand it would hardly be economical to use the same arm for light lines (0·05 sq in. and under —for which in any case an existing specification is available—B.S.S. 1320) as for heavy lines using 0·1 sq in. and 0·15 sq in. conductors.

When designing for the heavier lines, however, it may be found that the minimum arm which could be considered satisfactory for general use is only about 30-35% lighter than one which would meet all requirements. This will depend upon the nature of the territory for which it is intended to cater.

In mountainous country where a very small percentage of poles may be quite abnormally loaded the use of at least two sizes of arm may be considered desirable.

Later in this article some guidance is offered regarding the probable percentage of poles at which abnormal loading may be encountered. Such a guide can of course only be of a very rough nature.

On the basis of a parabolic sag—which is sufficiently accurate for practical purposes—the vertical load *per conductor* at a support is given by

$$F_v = T\left(\frac{h_1}{L_1} + \frac{h_2}{L_2}\right) + W\frac{L_1 + L_2}{2}$$

where T is the conductor tension under loaded conditions (wind and ice), W is the weight per foot of ice loaded conductor, h is the difference of level of the points of support at either end of the span and L is the span length (both in feet). The suffix 1 or 2 indicates which of the spans either side of the pole is in question. It should be noted that h is positive where the support whose load is to be investigated is above the adjacent support. L is always positive.

It will be observed that the first term is the sum of the vertical components of the tension in each of the spans (T being theoretically the value of the horizontal component). The second term is half the weight of the loaded conductor in the the two spans.

Table II shows the result of an examination of the profiles for a number of lines. By "weight-span factor" is meant the number by

TABLE II—WEIGHT-SPAN FACTOR OCCURRENCE

Weight-span Factor Exceeds:—	2	2½	3	3½	4	4½	5	5½
Type of Country	Percentage of Poles							
Rolling... ...	0·75	0·3	0·15	Nil	Nil	Nil	Nil	Nil
Hilly	3·0	1·2	0·8	Nil	Nil	Nil	Nil	Nil
Mountainous ...	—	4·7	3·1	1·2	0·4	0·4	0·4	Nil
All three ...	—	1·5	1·0	0·25	0·09	0·09	0·09	Nil

which the maximum design span must be multiplied to give the "weight-span." The weight-span is the vertical load F_v divided by W (the loaded weight). It will be seen from the table that the number of occasions on which the weight-span exceeds 2½ times the maximum span is very small, while it was found to exceed 3½ times the maximum span only on a mountainous route and then only at one pole out of about 250. At this pole the weight-span factor was over five and the load due to one loaded conductor would be 1,500 lb. In this case the line was of 0·1 sq in. copper; had it been of 0·15 sq in. copper the load would be about one ton per conductor. It would scarcely be an economical proposition to design all cross-arms for this loading.

Section Cross-arms

The vertical loading at section poles will be somewhat greater on account of the additional weight of insulators but in view of the indeterminate nature of the vertical load for which allowance should be made and the comparatively small difference which the insulator weight will make this may safely be ignored and it will be satisfactory to design the section cross-arm for the same vertical loading as the intermediate arm.

It is also necessary to decide whether the section pole is to be expected to withstand broken line conditions. In the case of a wood pole line, unless in-line stays are fitted the pole will obviously not support the line with all conductors broken, and it is questionable whether a single wood pole would support even one broken conductor, as the twisting would tend to split it. Certainly, if the arm is designed for full terminal conditions there seems a danger that pole failures would result which would be avoided if the arm were allowed to bend under conductor tension and so ease the load.

Section arms should, however, be sufficiently strong in the along-line direction to withstand with negligible deflection out-of-balance forces due to normal temperature variations in sections having different equivalent spans.

Uplift

Where section supports are subject to uplift, it is desirable to investigate the resulting cross-arm loading. In the case of pole lines it is also necessary to consider the possibility of poles being uprooted. Poles in danger of uprooting can be anchored economically by fitting a small cross baulk near the butt.

The equation for calculating F_v is the same as that for downward loading—but it must be

remembered that h_1 and h_2 will be negative (at least one of them must be if uplift exists), and the resultant force F_v will also be negative.

It may be found more convenient to treat F_v as positive and re-write the equation

$$F_v = T\left(\frac{h_1}{L_1} + \frac{h_2}{L_2}\right) - w\,\frac{L_1 + L_2}{2}$$

where h is *positive* when the support whose loading is under consideration is *below* the adjacent support.

It should also be noted that the two terms on the right-hand side have opposite signs and the maximum value of F_v for any given values of h and L may correspond to a large value of T, or a small value of w. That is to say, either to loaded or unloaded conditions. Accordingly both conditions should be investigated, i.e. with w corresponding to weight of loaded conductor and T to the tension under wind and ice, or with w corresponding to unloaded conductor and T to tension at 22° F. under wind load only. Only in the most severe cases of uplift will the loaded condition prove to be the worse.

Objection is sometimes raised to the inclusion of the second term in the uplift equation on the ground that a pole subject to uplift cannot be carrying half the conductor weight. Such a point of view is due to a misunderstanding of the problem. The first term implies that the line of action of the conductor tension at the support lies along the straight line joining the points of support. This, of course, is not the case, and the second term makes the necessary correction.

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ELECTRICAL RESEARCH IS VARIED

RESEARCH in electrical manufacturing concerns provides a varied pattern, differing from that in many other industries. It is not confined to a single type of product, in different forms and of varying characteristics as is, for example, the rubber industry; nor only with, more or less, one class of apparatus, such as structures or prime movers, for example. It is this variety of interests which was stressed by Mr. L. J. Davies, M.A., B.SC., M.I.E.E. (B.T.H.), in a lecture delivered last Thursday to the I.E.E. Utilisation Section.

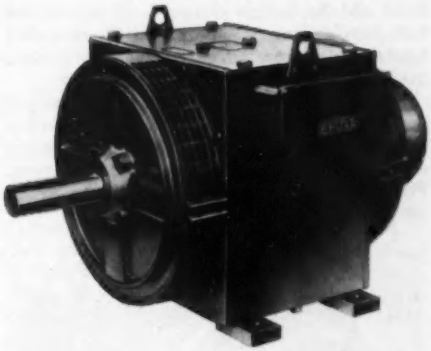
In electrical manufacturing, moreover, research has a most indefinite boundary with "development," and this again leads somewhat vaguely into design and production engineering. In many design departments of electrical manufacturers, work is going on that could be classified, according to the definition adopted, as research on advanced development. Some work in the research laboratory is correspondingly really design engineering or even production.

Such overlapping is very beneficial from the point of view of appreciation of research, and the translation of research results into practice. There can usefully be, and frequently is, an extension of this overlapping of work into an exchange of personnel between the research department and other staffs. In some cases it is helpful for some or all of a research team to leave the research department with a product, and to carry either to design or to production their specially acquired know-how and understanding.

Mr. Davies backed up his general consideration of industrial research with a broad survey of current research projects. Amongst those which particularly attracted attention was the problem of colour and the fluorescent lamp. Now that the tubular fluorescent lamp is available with a wide range of colour possibilities, there seems to be a definite demand for a fluorescent lamp having the colour appearance and the colour rendering properties of tungsten. If the red content of the fluorescent lamp is increased with this in view, it is found that blues take on a purplish tinge, and that any tungsten lamps used within the installation appear greenish. Double coating of lamps with two layers of fluorescent powder can help solve this problem.

Unusual elements are growing in importance for the electrical industry. An example is tellurium, whose oxide provides a glare giving excellent transmission of infra-red radiation. Germanium is, of course, even more interesting. The electrical resistivity of pure germanium is 60 ohms/cm cube at room temperature, but if one impurity atom—say of antimony—is added to every 10^8 atoms of germanium, then the resistivity falls to about 4 ohms/cm cube.

Square Path Alternators



New Brush Range embodies unusual Stator Design

IN view of the competition in the export market for small petrol and diesel generating plant, the Brush Electrical Engineering Co. investigated closely the possibility of reducing the weight and price of their alternators, yet at the same time maintaining ease of assembly and good electrical and mechanical characteristics. The result of this work was shown to the technical press last week, when the company introduced the new range of "Square Path" alternators.

It is claimed that these machines also possess great advantages in that they save considerable steel and occupy much less volume when being shipped than the more usual form of construction which uses the cast stator body.

These alternators are in sizes from 1½ to 35 kVA and are of the self-excited, self-regulating type, the regulation being ± 2½% at unity power factor for the 1½, 3 and 6 kVA sizes. On outputs greater than 6 kVA, an inherent regulation of ± 5% is obtained over a range of power factors from 0·8 to unity.

Electrical Detail

The most characteristic feature of this range lies in the stator which fundamentally consists of four mild steel plates in a box structure. The poles are of solid construction, welded to the magnet frame and provided with laminated pole pieces. Magnetic flux levels are computed for the stator assuming a 0·005 in. gap at the joints at the corners of the box. In practice this gap is, of course, never attained. Full advantage of modern plastic techniques in wire covering has been taken by the extensive use of polyvinal-acetal-covered wire both for the field windings and for the armature. This latter item carries both the d.c. generating winding with its associated commutator and the a.c. winding with its associated sliprings. The latter uses former wound coils and the d.c. winding is distributed in the same slots, care being taken to provide adequate insulation between the two sets of windings. The commutator, built up from hard-drawn copper section with mica separators, is pressed on the shaft, the ends of the d.c. winding being inserted and soldered into milled slots. At present the commutator is of the conventional "V" ring type, but work is progressing to develop a plastic insulated type of commutator for this duty. Connection of the a.c. winding to the sliprings is through a hollow shaft.

Mechanical Construction

Slot wedges serve to secure the windings within the armature core, which is built from high permeability electrical sheet steel laminations pressed hydraulically on to the shaft and aligned by means of a steel key. Except in the small sizes, the end windings are retained by steel wire bands, insulated from the windings clipped into position and dynamically balanced.

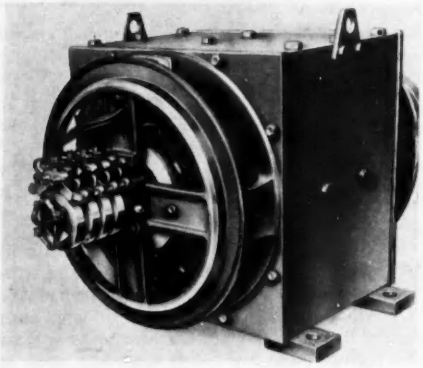
All the machines are provided with ball bearings housed in end-shields spigoted on to the magnet frame. The bearing caps have long axial bores for optimum sealing of the bearing enclosure, and sufficient grease is inserted during assembly to provide satisfactory lubrication, under normal operating conditions, for at least twelve months.

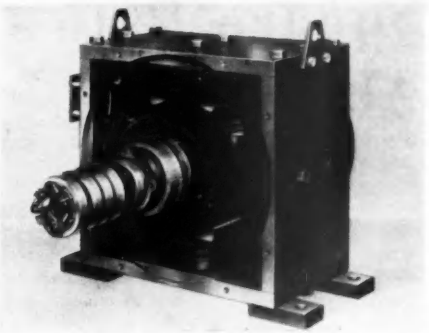
The shaft is machined to close limits from 40-ton (ultimate tensile) steel bar, the bearing seatings and extension being accurately ground to size. Cooling air is provided by a ventilating fan, secured to the shaft and dynamically balanced with the armature.

Brush gear is of the normal type, and is designed to ensure adequate brush life and easy maintenance. Two brushes per slipring are

fitted and the current density at all brush contacts provides an ample margin on recommended figures. Adjustable brush tension is, of course, available to take up normal service wear.

The machines can be made for single or three-phase outputs at 50 or 60 c/s as required and comply with B.S.S. 168. They also comply with Canadian and Australian requirements. Production is being undertaken at the Brush works at Cardiff.





Above: Magnetic frame. Field coils and rotor assembled. Left: View on slip-ring end 3-phase alternator 4 wire

They are, of course, specifically suitable for driving by petrol or oil engines and for that reason have great potentialities in isolated rural areas where electricity supply is either highly expensive or non-existent. It is thought that there is a large and expanding field for these plants in the Dominions and even at home for the operation of farm appliances and for general use.

Killing Pests by Dielectric Heating

MENTION was made in last week's issue of the ELECTRICAL TIMES of insect killing in grain by high frequency electric fields being investigated by the E.R.A. at Shinfield. A report recently issued by the Association, "Pest control by high frequency electric fields—a critical résumé," by A. Morris Thomas, B.SC., F.INST.P., M.I.E.E. (W/T23), reviews present knowledge and past work in this field.

That this subject is of importance is indicated by the damage caused to this country's foodstuffs by pests. Of the total production, from 30 to 40% is lost, either in the field or after harvesting, by insect attack. The surest known method of destroying these insects is by the application of heat, but if applied externally the temperature of the host material must obviously be raised at the same time with its consequent deterioration.

For this reason alone, heating by high frequency fields has undeniable attractions, although certain conditions must be fulfilled before this method is of value. Initially, the electrical conductivity of the pest must exceed that of the host. As successful killing depends on a high rate of heat generation in the pest compared with that in the host or high "differential heating factor," this is determined to a large extent by their comparative electrical conductivities and permittivities.

The Heat Factor

It is made clear in the report that killing by electric fields is due, almost without exception, to heating. Previous arguments had suggested that a "specific" effect, one of which a rise in temperature was not an essential factor in the lethal properties of the field, was also present, but except for isolated cases this is largely discounted. The frequency of the field must exceed a certain critical value, known as the transition frequency, which for most biological materials lies within the range 1 to 200 mc/s. Although there may be selective frequencies at which heating is a maximum in any one organism, killing can be effected rapidly at any frequency above the transition value, without injury to the host.

Allowance must also be made for voltage applied to the electrodes and several thousand volts are usually required for electrode separation of a few centimetres. Moreover, there is a minimum limit, approximately 0·04 cm, for the smallest linear dimension of the pest below which killing is not effected.

NOTES ON WIRING by Megohm

More Socket-Outlets

ROUND about Christmas time last year readers will recall I drew attention to the fact that Canadian appliance manufacturers were concerned with the inadequate wiring in residential premises in Canada and they were advocating that a national drive be put under way with a view to correcting this position.

Also at home here it was at Christmas time the apparent shortage of socket-outlets in our homes was brought to the fore by gifts of electrical appliances, and maybe this factor had some bearing on the very unsatisfactory temporary extensions to installations which are only brought to light and publicised in the national press when a serious accident occurs.

Safe and Sufficient

A correspondent some time ago wrote to me saying "Here is a little problem that you might care to think about and answer in your column."

"In the bedroom of my flat there is one 15-amp socket between twin beds. We want to use a clock, bedside radio, table lamp and my wife requires an electric heated pillow and I use an electric shaver." This correspondent then goes on to enquire what is the safest, least expensive and neatest method of making provision for these bedside comforts. He is not in favour of long trailing flexible cords and considers multi-way adaptors which can be purchased in chain stores and elsewhere an abomination. As a temporary measure he has mounted 4-5 amp sockets and a clock connector on a wood block. These accessories being connected to the 15 amp socket by a short length of flexible cord fitted with a 5 amp fused plug. In another room similar problems arose and have been dealt with in the same manner.

Necessary Contravention

Finally, this correspondent states "I feel sure this must contravene many Regulations but I think it is reasonable and safe," and concludes with the observation . . . "but surely I am not the only consumer who needs many outlets—and what is the real answer?"

The real and only answer obviously is the installation of a sufficient number of socket-outlets in every living and sleeping room in the home and most certainly this correspondent is not the only consumer who requires an adequate number of socket outlets in his home. In every properly equipped home there should be at least one socket outlet to every 50 square feet of floor space to provide adequate coverage. The point arises who is responsible for more or less forcing consumers into the position of having not too satisfactory extensions carried out, as described by my correspondent. Surely this can be directed to the specifying authorities whether it be the private builder, local authority or architect. From general reports I receive, the most likely persons to restrict outlet points in residential premises are the speculative builders and architects.

Mr. Christian in a letter published in the ELECTRICAL TIMES on the 30th April says it is a pity I am preaching to the converted. Let me hasten to say my intentions are never to preach but to state facts and I am wondering are we all converted yet? Mr. Christian rightly refers to the excellent suggestions contained in the Code of Practice documents, etc. and deplores, or I would prefer to say is suspicious of, the policy advocated by the Bailey Committee when they stated that whatever wiring system is adopted it is important that the number of light and power points per house should be kept to a minimum. Providing the minimum number of socket-outlet points is not less than 20 per 1,000 sq ft most users would be prepared to accept their recommendation.

Circuit Details

Maybe the Bailey Committee can be persuaded to give more precisely their views on this matter and I would recommend that the British Electrical Development Association—if they have not already done so—let this Committee have full details of the ring circuit system of wiring to 3 kW socket outlet points and costs per socket outlet, together with the probable cost for socket-outlet extensions installed after a building is completed and occupied, not losing sight of the fact that buildings have been damaged by fire alleged to be caused by defective wiring extensions.

May I suggest that the provision of an adequate number of socket outlets in the home will surely reduce the need for wiring extensions and make for more safe and useful installations.

BRITISH STANDARDS

Primary cells and batteries for intrinsically safe bell signalling circuits in coal mines. *B.S.* 1975: 1953. *Price* 2*s.* 6*d. net.* Discussed in this standard are Leclanché type primary cells and batteries. To be intrinsically safe these should be constructed for current limiting so that sparks produced in the signalling circuit have insufficient energy to ignite inflammable gas. Dimensions of component parts, electrolyte composition for wet cells and performance requirements are specified, whilst the cell output is limited to an amount meeting requirements of the recognised testing authority.

Limits and fits for engineering. *B.S.* 1916: *Part* I: 1953. *Price* 10*s. net.* Under a sub-title of "Limits and tolerances," part I of B.S. 1916 offers a system of limits and tolerances sufficiently comprehensive to cover most requirements over a wide field of engineering activities. Moreover, it makes available, in inch measure, the same range of fits as the I.S.A. system has given to Continental countries. This standard also supersedes B.S. 164, giving a choice of fits to enable users to transfer from existing systems without difficulty.

Glossary of Terms used in Illumination and Photometry. *B.S.* 233 : 1953. *Price* 3*s.* 6*d. net.* This recently published standard is a revision and extension of sub-section 81 of the Glossary of Terms used in Electrical Engineering (B.S. 205). Many of its definitions and terms agree with those adopted by the International Commission on Illumination and properties of "Standard Observer" agreed by the Commission form the basis for some of the quantities defined.

Tolerances on diameters of carbons for projection arcs and stage arcs. *B.S.* 1964 : 1953. *Price* 2*s. net.* Tolerances in this standard are related to diameters of high and low intensity, plain and copper-coated carbons from 6 to 14 mm. in diameter for projection arcs, and plain and copper carbons of 10 to 25mm. in diameter for stage arcs. If the carbon holders in equipment are designed to accommodate carbons within the tolerances laid down in this standard, dimensional interchangeability of the carbons will be assured.

British Standards reviewed above may be obtained from the B.S.I., 24 Victoria Street, London, S.W.1, at the prices stated.

New Meter Requirements

NEW requirements for meter testing are announced in a letter which the Ministry of Fuel and Power has addressed to area electricity boards. These requirements are set out in a new Appendix B to the former Electricity Commissioner's Approval of apparatus for Meter Testing in Testing Stations (1937).

M.C.R. Meters

The new amendments are occasioned principally by the recent issue of a revised British Standard on meters (BS 37/1952) and the introduction of maximum continuous rating meters. In the Ministry's covering letter, attention is directed to three points in the new appendix. The first of these concerns the testing of long period dials, (Method A). The duration of the tests has been reduced to a minimum period corresponding to five complete revolutions of the pointer of the last dial of the meter under test. This applies to tests using substandard rotating meters. It is noted in the covering letter that certain older meters fitted with cyclometer or roller dials may need longer tests than the minimum five revolutions of the last dial mentioned for pointers. In such cases the duration of the tests is to be agreed with the area meter examiner.

Two changes are noted under the heading "Actual Tests." The first relates to single phase a.c. whole current meters, in relation to which a choice of testing loads is now allowed, thus permitting greater flexibility and the grouping for testing purposes of the three categories of meters. Ranges are as given in the accompanying table. Meter examiners will be required to be satisfied, however, that the meters are within the legal limits of error throughout the ranges specified in the appropriate BS 37.

SPECIFIED TEST LOAD RANGES

Testing Load	Load ranges in terms of marked current		
	M.C.R.	Long Range	Short Range
High	50%-100%	100%-200%	100%-125%
Intermediate	One intermediate load to be taken at any part of the curve between the high and low loads actually taken		
Low	1·67%-3·33%	5%-10%	5%-10%

The final modification has reference to balance tests on single phase three wire meters. The requirements for such meters are now in line with similar tests on polyphase meters.

It is understood that further amendments of the Approval are under consideration, and that a complete revision will be issued in due course.

GROWTH OF THE E.T.U.

Further amenities provided for members

WAGES, both in the electrical industry and outside of it, was one of the main subjects of discussion at the Annual Policy Conference of the Electrical Trades Union which opened at Clacton on Monday. But to judge from the number of motions in the final agenda, the British Electricity Authority and its operations were less of a target for resolutions at this conference.

Overseas guests at the conference included the president and vice-president of the Chinese Electricians' Union and M. Marcel Paul, president of the French Electrical Workers' Union.

The continued growth of the Electrical Trades Union, in its membership, its influence and the amenities provided for its members, was emphasised by Mr. Frank Foulkes, in his presidential address on Monday. The number of members was 203,344, he said, and the E.T.U. was the seventh largest union affiliated to Congress—a total of 164,063 members pay the political levy, some 84% after allowing for members in the Forces.

A Residential College

In addition to the Convalescent Home, the inauguration of the union's college at Esher, the first residential college possessed by any union in Britain, would take place on June 21. Their objective was an enlightened, educated and intelligent membership, he went on; a membership that could give a lead on negotiations in the workshop, on discussions at district and national level and on the broader fundamental issues that confronted the working class movement from day to day.

The results of wage claims this year would determine whether the organised employers and the Government were to decide the level of existence of the workers, or whether the latter would insist upon deciding their own living standards, Mr. Foulkes added.

During subsequent discussion the conference agreed unanimously to instruct the Executive Committee once again to investigate the possibility of a superannuation scheme for all members. The resolution called on the committee to press for payment of the whole or most part of the contributions by the employers. Submitting the motion, Mr. B. Finch, of Brixton, said the employers could well afford the contributions. On the engineering and electrical manufacturing side profits had increased astronomically in the last few years. Mr. J. Hobday (Nottingham South) warned members that if contributions were paid by the employers it might mean that they would push up the charges for electricity.

The assistant general secretary, Mr. F. Haxell, said there was a feeling that the Union ought to try to do something for members who were forced to retire but they had to face up to the fact that there were certain limits to what they could do. He reminded delegates that research had shown that it would be impracticable for the union to run a superannuation scheme.

If the employers and the State were prepared to finance the scheme, it could be done, but to suggest that the Union should finance it was quite impracticable, he maintained. The executive supported the proposal.

No Standard Rate

A resolution seeking the establishment of a national standard rate for each industry was rejected after the general secretary, Mr. W. C. Stevens, had opposed it on behalf of the executive. They believed the differential given to the London members was given to them to offset the extra living costs borne by them, he said, adding that the existing London differential of 5d. per hour included about 2d. an hour in lieu of travelling time. In fact the Executive would be very happy if they could persuade the employers to exchange this 2d. per hour for payments under the National Travelling Time Agreement, he added.

Mr. Stevens claimed that it had been computed that extra living costs in London accounted for the equivalent of 3¼d an hour. Out of that total, higher rents accounted for 2d, travelling ¾d and the extra cost of meals when there was no canteen took the remaining ¾d. The conference also called for an increase in the country allowance to a sum commensurate with the present cost of accommodation.

Other resolutions passed during Monday's session called for increased wages for apprentices and similar rates for apprentices in both Great Britain and Northern Ireland; adequate training facilities in all firms employing

apprentices; and for a sick scheme for all members in the contracting section.

On Tuesday, there was an attack on the T.U.C. General Council for advising a policy of moderation in wage claims. Later the conference passed a resolution asking the Executive to take steps to bring wages, hours of work, holidays, sick pay and pensions of manual workers in the Electricity Supply Industry into line with those of the clerical, administrative and technical grades. Delegates also supported a proposal that the schedule of protective clothing for certain grades of workers in the Supply Industry, should be amended. The Conference continued its discussions.

Registration of Operatives

The annual report, presented at the conference on Monday, is somewhat bulkier than usual, indicative of a very active year by the union. Among the matters which demanded, and received, careful and lengthy attention during the year was that of registration of operatives in the contracting industry, and the negotiations between the union and the National Federated Electrical Association on the question are recorded at some length. It is stated that the sub-committee held the view that adequate justification existed for the compulsory registration of both employed and employer, notwithstanding the proposals put forward by the Organising Committee of the National Inspection Council.

The N.F.E.A. was of the opinion that the fundamental defects in the proposals of the Organising Committee were that they were based upon the creation of a Roll of Approved Contractors and an Inspection Council devoid of statutory powers. It was not the qualified contractor—who would be eligible for admission to the Roll—who was the danger, they maintained. The whole scheme would fail in its object because, being of a voluntary character, the Inspection Council had no powers to inspect the work of non-approved people, among whom were the ever-increasing number of "kerbstoners," factory handymen and amateurs.

The N.F.E.A. rejected the Organising Committee's scheme and put forward alternative proposals (at the moment confidential), based on the creation of an entirely independent Inspection Council with statutory powers to inspect all installations. Under this, a roll of approved contractors would not be necessary, and it is evident that the N.F.E.A. was not finally wedded to compulsory registration

"Columax" Commercially Available

FURTHER developments in the field of permanent magnet research have resulted in the commercial production, by Swift Levick and Sons, of Columax. This new material possesses the highest magnetic energy per unit of volume yet achieved in commercial magnet alloys. It is based on the well-known Alcomax III, but is manufactured by a special process which replaces the equiaxed crystals of the normal alloy by long columnar crystals in a preferred direction coincident with the direction of magnetisation of the magnetically heat-treated and finished magnet.

Certain limitations are, however, imposed on the shapes of Columax magnets, which must be in the form of simple solid cylinders or rectangular blocks in which the direction of magnetisation is linear. Neither cored nor drilled holes may be included and thus alternative methods of fixing must be employed. However, solid slugs and rectangular blocks can be assembled into iron circuits of diverse character to perform various duties. Examples of these are centre pole loud-speaker magnets, composite instrument and meter-damping magnets and so on.

Magnetic Properties

The magnetic properties are to some extent dependent on the size and shape of the casting and the amount of grinding which has been done. Generally the best properties are obtained with magnets which have been ground all over. The table gives average and minimum values for Columax magnets:

	Average	*Minimum*
B_{rem} (gauss)	13,000	12,800
H_C (oersted)	740	700
$(BH)_{max}$ (M.g.o.) ...	6·8	5·5
B_s (gauss)	17,000	17,000
H_s (oersted)	3,000	3,000

The highest figures, obtained on a specially-prepared laboratory specimen tested by the N.P.L. were B_{rem}, 13,450 gauss; N_c, 840 oersted and $(BH)_{max}$ 8·63 Mg.o.

The manufacturers point out that when magnetising care must be taken to provide a minimum field of 2,400 ampere turns per cm length, and they state that it is of paramount importance that applications of Columax should be discussed with them before designs are finalised if difficulties are to be avoided.

PROBLEMS AND PRACTICE in Engineering

Radio Interference

THE following letter was received from a housing tenant: "I have to report that I am experiencing considerable interference on my radio receiver. I don't think this interference is due to any fault in the receiver, as it is most pronounced when a water tap is turned on."

This house was wired by means of T.R.S. cables having 2-core for lighting and 2-core and earth for the 13-amp socket outlets. The tenant had installed his own aerial and earth system for the radio set, having fixed a rod type aerial just below the eaves and sunk a $\frac{3}{4}$ in. iron bar, for the earth electrode, just outside in the garden. No attempt had been made to obtain an earth connection from the 13-amp socket outlet.

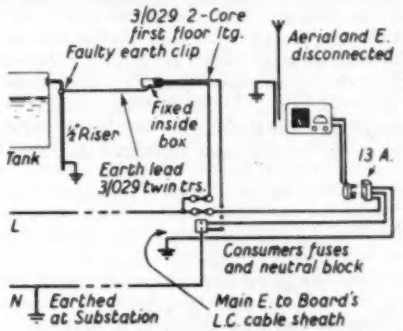


Diagram of the consumer's installation showing position of faulty earth connection

The aerial and earth connections were first checked that they had not inadvertently become cross-connected or had developed a short circuit. I then tested the earth installed by the tenant with an earthometer and found it to be unsatisfactory, but on disconnecting the aerial and earth the interference was still evident. The permanent earth system of the electrical installation was checked by connecting between the Electricity Board's earthed neutral and the common earth connection on the socket outlet and found to be in order (0·5 ohm). This good earth I connected to the radio set, but the annoying interference persisted. As the earthing system was in order I concluded the radio set was at fault.

Trying the substitution method, I confidently carried the set into the adjoining semi-detached house and connected up, but no trace of interference could be discerned. Having retraced my steps into the "trouble" house with the radio set, I connected it to another 13-amp socket outlet upstairs. The tap was again turned on and the interference continued.

Then the tenant remarked that several first floor ceilings had had to be re-decorated due to damage by water after the cistern tank had been faulty, but this tank had now been replaced. Consequently, balanced on a bedside cabinet, I struggled up into the roof and slowly perused the scene with my torch. It eventually came to rest on a pressed steel box into which ran all the two-core, 3/029, lighting cables via rubber grommets, all cables dressed and saddled to wood boards fixed for the purpose, quite a workmanlike job.

I ran my fingers around each cable entering the box and *then* I found the culprit. One of the 2-core T.R.S. cables didn't enter the box, but passed under it. I opened the box and the two cores of this cable were connected to the metalwork of the box. I traced this cable along the roofspace to the cistern tank, where it was connected to the $\frac{1}{2}$ in. copper cold water feed pipe by means of an earth clip. The earth clip fell away from the pipe as I placed my hand on it. It now became apparent that the plumber had broken the clip when fitting the new tank. Whilst the new tank had been fitted for five months, the radio interference had only been experienced for two weeks. The tenant's previous annoyance now disappeared as the radio set regained its normal performance.

The earth connection in the roof space only became faulty after a water tap at a sink or wash basin had been turned on. This was due to the cold water running up the $\frac{1}{2}$ in. cold water feed pipe into the cistern storage tank and causing the necessary vibrations to give intermittent contact between the earth clip and the feed pipe. As the aerial and earth lead had been disconnected with interference still present, the interference was probably mains borne, being picked up from the earth lead and amplified by the metal box which radiated the radio interference frequency via the consumer's mains to the radio set.—*D. Clark.*

An Alternator for Close Voltage Regulation

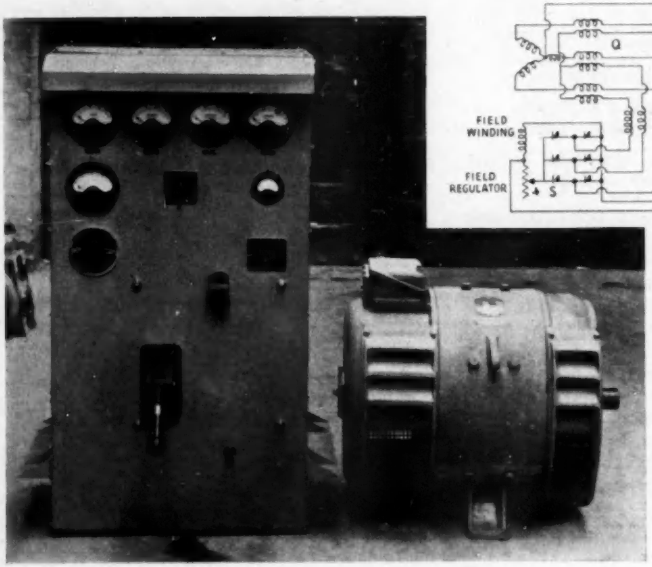
Self excitation and regulation effected by static methods

IN response to demands for constant voltage supplies at varying loads and power factors, Arthur Lyon and Co. (Engineers) Ltd. have produced a low voltage regulation alternator which was demonstrated last week at their Stamford works. Designed primarily for use with a diesel engine as the prime mover, the machine is self excited by static methods, this feature being associated with that of close voltage regulation.

In its basic construction, the alternator is little different from conventional externally excited machines. It has a lap-wound rotating armature, with skewed slots and short chorded windings, from which take-off is through slip rings and a salient pole field system. This, incidentally, is built up completely as a separate assembly and pressed into the heated stator casing, to obtain, on cooling, a shrink fit.

Excitation is obtained from the output of the machine using voltage and current transformers of a special type. In Fig. 1 is shown the diagram of the excitation and voltage control circuit, from which it is seen that for each phase, the secondary windings of both transformers are joined in series to provide the excitation supply. This alternating voltage is rectified, using metal rectifiers, the d.c. output being fed through a field regulator to the field windings.

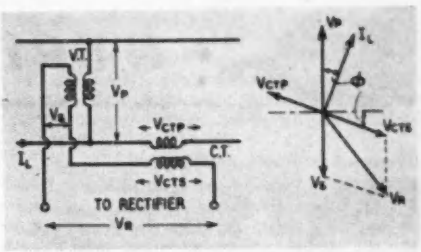
The voltage supply to the rectifier consists, therefore, of a component proportional to the line current and a component proportional to the line voltage. It is the former component which provides the regulation. Considering the simplified diagram shown in Fig. 2(a), for given conditions of terminal voltage V_p, line current I_l and power factor φ, the resultant voltage V_r appearing across the rectifier will be the vector sum of V_s, the secondary voltage of the voltage



In Fig. 1 (above) is shown the circuit diagram of the excitation and regulation circuit for a 3-ph. machine. Q and R are the current and voltage transformers respectively and S the main excitation rectifier. T is the auxiliary rectifier for initiating excitation and U its associated contactor. On the left may be seen a 25 kVA machine and its control unit

transformer and V_{cts}, the voltage induced in the secondary winding of the current transformer. This voltage is related to V_{ctp} the voltage established across the primary winding of the current transformer due to the load current I_l flowing in it.

Fig. 2(b) represents these conditions vectorially, bearing in mind no allowance is made for effects of magnetising and iron loss currents and voltage drops in resistance and leakage reactance of each transformer. V_{ctp} is, therefore,



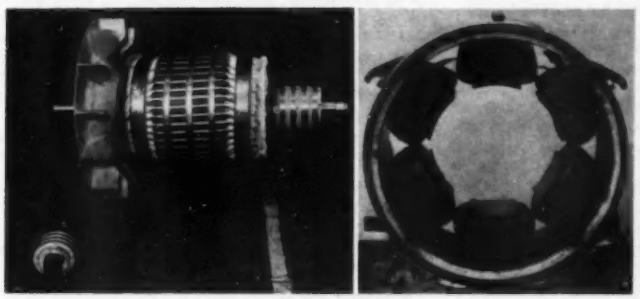


Fig. 2a, above left, shows a simplified circuit of the current and voltage transformers whilst 2b, right, illustrates the conditions vectorially. On the far left is shown the rotor-armature of the machine, which is seen to be of conventional construction whilst the salient pole field system is shown on the near left

assumed to be in quadrature with I_l. As I_l varies in magnitude, due to changes in load, V_{cts} will vary in sympathy affecting the resultant voltage across the rectifier. As this is proportional to the current flowing in the field windings, the excitation will increase with increasing load, to counterbalance the effects of increased load current on the induced voltage.

Moreover, if the lagging phase angle φ of the load increases, the vector V_r will rotate toward that of the voltage transformer secondary voltage V_s. As this effects an increase in V_r up to a maximum at 90° phase angle or zero lagging p.f. the consequent increase in excitation offsets the tendency of the lagging load current to reduce the armature induced voltage.

It follows that a leading load current will have the reverse effect, and these alternators are hence not designed for use on capacitive circuits where the power factor is worse than 0·95 leading. An adjustable air-gap in the iron circuit of the current transformer not only ensures that the voltage in its secondary winding is approximately in quadrature with the load current but provides variation of the compensation provided by it.

In the single phase version of this machine, an auxiliary winding, situated in what would be otherwise the unused slots of the armature, provides that component of the excitation proportional to the voltage. Another 3-phase model, designed for two outputs, either at 415 volts at 50 c/s or 208 volts at 60 c/s has an associated auto-transformer, from which a tapping provides this voltage-proportional component.

Due to the high forward resistance of selenium rectifiers used to provide excitation, the machine is not self-exciting. An auxiliary circuit is provided to effect self-excitation using a small bridge connected rectifier (T in Fig. 1). The a.c. supply is derived direct from two lines of the output through a resistor and contactor contacts whilst the rectifier supplies the field winding and the operating coil of the contactor. As the excitation from this circuit builds up, the contactor is opened, shutting off this supply but the main excitation source is then sufficient for operation.

Tests made during the demonstration of the alternator, at varying loads, power factor and engine speed had indicated that the regulation of 1½% within speed variations of 4%, claimed for the 3-phase machine, is attainable provided a suitable prime mover is used. Other tests indicated that two alternators could be synchronised on both no-load and load with comparative simplicity. For parallel operation, the field windings are cross connected. The regulation circuit was also seen to provide sufficient stability against violent voltage fluctuations with direct on-line motor starting, within the limitations imposed by prime mover used during this test.

overseas news

Pumped Storage at Niagara

Plans of the Hydro-Electric Power Commission of Ontario for the Sir Adam Beck No. 2 development on the Niagara River, which have already been twice revised and expanded, are to be still further extended, Mr. R. H. Saunders, chairman of the Commission, has revealed. This new plan calls for the establishment of a huge storage reservoir, a pumping station, widening of the canal now being excavated and preliminary construction to allow for the installation of four additional 100,000 h.p. generating units in the station when required. The scheme will eventually provide the Commission with another 625,000 h.p.—more than half Ontario's share of the St. Lawrence power project—from the Sir Adam Beck development. It also prevents the necessity for further steam generating plant construction at the moment. The initial stage of this new construction, which will start immediately, will cost about $5 million. Under treaty arrangements with the U.S., Canada and its agency, the H.E.P.C., is able to divert 50,000 cu ft/sec of water from the Niagara River during daylight in the tourist season and 75,000 cu ft/sec at other times. Under the new plan, water diverted during the night and at other low power demand periods will be taken out of the open cut canal—a link in the new station already under construction—and pumped up into a 4,000 million gallon reservoir. The four new sets will be added to the twelve already under construction as needed. The station is expected to be operating next year. In announcing the plans, Mr. Saunders emphasised that the urgency and the need for power from the St. Lawrence was in no way lessened by the Commission's expanded programme at Niagara.

Saskatchewan Still Hoping

The adverse findings of the Royal Commission on the proposed South Saskatchewan power and irrigation scheme, which we recorded on January 15, has not caused the Federal Government to definitely turn its back on the project, the Canadian Prime Minister, Mr. St. Laurent, told the House of Commons last week. The Commission, estimating the cost of the scheme at $250 million, considered that the benefits accruing from the electric power developed (a potential 435 MW) and farm irrigation would not be commensurate with the capital expenditure involved. But the Saskatchewan Government considers the Commission's estimate is much too high (a 1947 survey put it at $150 million). Apparently the divergence between these figures prevents the Federal Government from being able to determine that the undertaking is a reasonable project to undertake in the Canadian economy at the present time.

B.C.'s Record Year

The British Columbia Power Commission anticipates that final figures for the year ended March 31, 1953, when available, will show the latest fiscal year to be the most successful in the commission's eight years of operation. The year's surplus is estimated to exceed $325,000. The net surplus earned by the various power districts in the 11 months ended February 28 was $307,854. In the same period, power production increased 39% over the corresponding period in the previous year.

Trinidad's Need

Extensions to the island-wide electrification scheme of the Trinidad and Tobago Electricity Commission planned for up to 1957 will call for an additional $10½ million, according to the latest revised estimates. Legislative authority exists for the borrowing of $10 million, but this was only intended to cover the years 1948 to 1953, we understand. Part of the additional expenditure is for the purchase of new generating plant, which is urgently needed and is estimated to cost $601,000. Whereas the number of units sold last year amounted to over 57 millions, it is now estimated that by 1957 that figure will be trebled. It has thus been necessary to revise and expand the programme. These new estimates show that the funds required by 1957 will be $18·3 million, as against $9·5 million in 1954.

Southern Portugal Scheme

A decree has been issued in Lisbon authorising the Uniao Electrica Portuguesa to construct h.t. power lines and the necessary transformer stations to supply power to the districts of Evora, Beja and Faro, in southern Portugal. It is expected that the work will be completed within the period of the Six-Year Plan.

Nationalisation

The Iraqi Government has decided to nationalise the British-owned Bagdad Light and Power Co., it is reported. The undertaking is to be operated by a special board controlled by the Minister of Communications and Works, the statement adds. The council of Ministers has apparently asked the Minister to negotiate with the company's directors on the methods of transfer and on the question of compensation. From information at present avail-

able it is not clear if the decision affects the country's other two major supply undertakings—that at Basra, which is operated by the Port Directorate, and that at Mosul which is carried on by the Municipal Electricity and Water Board. The Bagdad Light and Power Company has been operating under a 50-year concession granted in June, 1928, which provided for the works and plant to become the property of the Government free of charge on its expiry. The Government also has the right to purchase the undertaking at a valuation as a going concern at the end of 1954 or any five-yearly period thereafter. The company operates a steam generating station with an installed capacity of 41,000 kW. Sales in 1951 amounted to 44½ million units.

Atomic Power for Australia?

Immediate action in co-operation with Britain to establish atomic energy power stations in Australia, was urged last week by Prof. M. Oliphant, director of the School of Physics at the Australian National University. Addressing delegates at the Electrical Industry Convention, he deplored the fact that Australia should become more dependent on imported oil while resources for atomic power were at hand. He considered that in co-operation with Britain, atomic power stations could be operating within a few years. He also predicted that uranium power stations would eventually be followed by hydrogen power stations.

Victoria's "Packaged" Plant

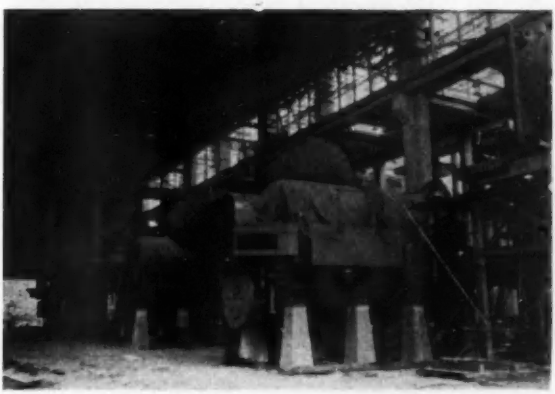
The first of three "packaged" generating plants is expected to be put into operation by the State Electricity Commission of Victoria during the next few weeks—within two years of the site being decided. Three stations are now nearing completion—at Geelong, where three 10,000 kW sets are being installed; at Ballarat, where four 5,000 kW units are in place; and at Red Cliffs, near Mildura, where the two 5,000 kW sets are expected to be operating by August. The first two stations will burn raw brown coal from nearby open cuts, and Mildura will use briquettes. Each of the stations have spreader stokers and full automatic combustion control, with oil-firing gear for emergency use. In each case the plants have been supplied by the Westinghouse Electric International Co.

Seeking Snowy Orders

Further evidence that Japanese heavy plant manufacturers are making a determined effort to obtain contracts abroad, is the news that the Tokyo-Shibaura Electric Co. has submitted a tender for the supply of plant for the T.I. power station under the Snowy Mountains hydro-electric scheme, Australia. Tenders for the four 80 MW generators and four 110,500 b.h.p. vertical shaft Francis turbines for this station were called last October, the closing date being February 24 last. But it will probably be at least another month before the award of the contract is known, we gather. For such a valuable contract, it is evident that there is stiff competition from American, French, Swedish and German as well as British manufacturers. In Canberra last week, the Minister of National Development, Senator Spooner, announced that the Commonwealth Government had decided to invite tenders immediately for the civil constructional work for this second stage of the Snowy Mountains hydro-electric scheme. This section will include the construction of a high earth dam on the Eucumbene River at Adaminaby to form the largest reservoir of the scheme, and a tunnel 14 miles long and 21 ft diameter. It is hoped that the first 80 MW generator will be operating by 1958.

Roxburgh Progress

All the work at the Roxburgh hydro-electric project leading to the diversion of the Clutha River is now in progress, it has been stated in New Zealand. Final preparations for lowering the upstream rock barrier, which is now holding back the river at the entrance to the diversion channel, have just begun. Intensive planning for the actual diversion work is under way. Constructional work began in July, 1949. The job is now being worked on a full double-shift basis, and the section of the work which comprises the first completion stage of the contract is now nearing an end. This is construction of the foundations and cable trenches, traverser track and workshops of the outdoor station to enable the State Hydro-Electric Department to start work on the reception and assembly of machines and equipment. The main stage which will follow the diversion will be preparation of the foundations of the first generator by February next. The first two 40 MW generators are scheduled for operation in July, 1955. There will be 8 sets.



"Packaged" plant in course of erection at Ballarat, Victoria

PERSONALITIES

IN THE INDUSTRY

Shortly leaving this country to take up the post of general manager, and a member, of the Central Electricity Board, Mauritius, is **Mr. A. N. Bott,** M.I.E.E., F.R.S.A., who is now district manager at Lyndhurst to the Southern Electricity Board. Prior to nationalisation of the industry, Mr. Bott was city electrical engineer at Winchester, going there in January, 1947, from the position of electrical engineer to the Kirkcudbright County Council. He received early training at the University College, Nottingham, later going to the Post Office Engineering Department, and then to the City of Nottingham Electricity Department. He was subsequently assistant constructional engineer to W. T. Henley's Telegraph Works Co., Ltd., whom he left to join the J. L. Eve Construction Co., Ltd. as constructional engineer in charge of survey and erection of grid lines. He later joined Johnson and Phillips Ltd. in a similar capacity, before being appointed deputy county electrical engineer to the Kirkcudbright C.C. in 1935, and was promoted to the major post in 1940. Mr. Bott takes up his new duties on August 1. He leaves this country on July 5, after which correspondence should be sent to him at the C.E.B., Port Louis, Mauritius. The C.E.B. of Mauritius has only recently been constituted to control and develop the electricity supplies throughout the island.

Mr. A. N. Bott

In recognition of more than 40 years' service in the Electricity Supply Industry, **Mr. E. A. Newburn,** M.I.E.E., manager of No. 2 sub-area of the South Western Electricity Board, was recently presented with a long service certificate by **Mr. S. F. Steward,** C.B.E., M.I.Prod.E., chairman of the Board. Mr. Newburn commenced his career as a pupil with the Doncaster undertaking, and later served at Rotherham, Rochdale, and Walsall, where he became engineer and manager before going to Bath in 1946 as city electrical engineer. On vesting day he was appointed deputy sub-area manager of the Bristol sub-area, and in April 1951 became manager of the Taunton sub-area, the position he still holds.

Mr. Newburn receives his certificate from Mr. Steward, right

Mr. D. R. S. Turner, B.A., A.M.I.Mech.E., has been appointed assistant general superintendent of the Rugby works of the British Thomson-Houston Co. Ltd., including outside factories under the control of Rugby main works. Since June, 1950, he has been assistant manager, turbine sales. The company has also appointed **Mr. G. P. Thompson** as superintendent, transformer factory (he was previously assistant to the superintendent), and **Mr. F. L. Shaw** as head of the insulation factory.

Mr. John Rostron, traffic superintendent with Sunderland Corporation Transport Department, has been promoted to the post of deputy general manager and traffic superintendent. Both posts are being merged following the retirement in July of **Mr. Stanley Finkle,** the deputy general manager. Mr. Rostron was formerly with Bolton Corporation transport undertaking. Mr. Finkle has been with Sunderland undertaking since 1909. He became chief clerk in 1945 and deputy general manager four years later.

Brown Brothers, Ltd., announce that **Sir Richard Yeabsley,** hitherto deputy chairman, has been appointed chairman of the new company. **Mr. B. L. Bisgood,** previously chairman, now resumes as deputy chairman.

Mr. G. M. Baker, B.Sc., who has been with C. A. Parsons and Co., Ltd., for 20 years, and has been the general works manager for some time, has been appointed to the board of directors of the company.

Sub-area commercial officer for Nos. 4 and 5 sub-areas of the Merseyside and North Wales Electricity Board, **Mr. T. R. Smith,** A.M.I.E.E., has been appointed assistant commercial officer at the Board's headquarters, in succession to **Mr. S. G. Roper,** who has joined the Southern Electricity Board as district manager at Uxbridge.

The Metropolitan-Vickers Electrical Co., Ltd., have appointed **Mr. C. P. Storr,** M.A., M.I.Mech.E., M.I.E.E., as power system engineer. He will be responsible, under the chief electrical engineer, for the investigation of problems of stability, load distribution, voltage regulation, and system fault, which can arise in the operation of large interconnected power networks. Mr. Storr took his degree at Cambridge and joined M-V. as a college apprentice in 1928. After working as a relay engineer he went out to the head office of A.E.I. (India), Ltd., at Calcutta in 1935. During the war he was with the Indian Ordnance Service as a works manager, but in 1946 he was appointed deputy chief engineer, A.E.I. (India), and became chief engineer and a director in 1949. In that year he was also made a director of Associated Electrical Industries Manufacturing Co., Calcutta. A past chairman of the Calcutta branch of the I.E.E., he has also served on committees of the Indian Standards Institution.

Mr. C. P. Storr

Mr. D. J. McIntosh has retired from the chairmanship of the Indian Cable Co. Ltd., of Calcutta, and at a recent function held in his honour was presented with a silver salver by his colleagues. He started with British Insulated Cables Ltd. back in 1921.

Mr. Kenneth J. Clarke, A.M.I.E.E., who has been on the staff of the Birmingham district office of the British Thomson-Houston Co. for the last sixteen years, has now taken up a staff appointment at the firm's Sheffield district office. The company also announce that **Mr. J. Goldsmith** has left their London district office to join the staff of the company's Birmingham district office. Both the foregoing are members of the Association of Mining, Electrical and Mechanical Engineers.

Mr. K. J. Clarke

Mr. A. G. Freeborn, B.Sc., director of Aquastat Ltd., has been elected president of the Batti-Wallahs' Society for the ensuing year, in succession to **Mr. J. W. Perkins,** M.I.E.E. **Mr. T. C. F. Bigland** is re-elected honorary secretary and treasurer, and **Mr. J. Temple Hazell** as assistant honorary secretary. In addition, the following members were elected to the committee: **Dr. L. G. Brazier,** Messrs. **M. D. Cloran, H. A. Crabtree, A. N. East, C. N. Good** and **G. H. L. Smith.**

Just appointed sales manager of the Cooker and Domestic Appliance Department of the Revo Electric Co. Ltd. is **Mr. B. A. G. MacFadden,** T.D., pictured here. His duties will cover both home and overseas markets. Mr. MacFadden had 10 years experience in the electricity supply industry before joining the English Electric Co. Ltd. in December, 1938. After war service with the Royal Artillery in the rank of major, he returned to English Electric Co. Ltd., and in his position as assistant to the sales manager spent some time abroad. He joins **Mr. P. Hartill** who is sales manager on the lighting and industrial side.

Mr. MacFadden

To cope with the rapid expansion of the business of the Electricity Trust of South Australia, and to relieve the general manager of as much detail work as possible, **Mr. C. R. S. Colyer** has now been appointed assistant general manager, **Mr. K. H. Milne** becomes chief engineer, and **Mr. J. C. Stobie** is now assistant to the manager (engineering research). Until recently Mr. Colyer was assistant manager (commercial) and Mr. Milne was assistant chief engineer.

From Ashley Accessories Ltd. we hear that **Mr. G. Sanders,** of 21 Riddrie Knowes, Glasgow, has joined the company as their representative for Scotland. He was previously for some years with a large firm of electrical wholesale distributors.

Mr. G. Sanders

Chief engineer to the Northern Aluminium Co., Ltd., **Mr. B. N. H. Thornely,** B.A., M.I.Mech.E., has been appointed to the board of directors. Most of the 24 years that Mr. Thornely has been with the Aluminium Ltd. group of companies has been spent with Northern Aluminium Co., Ltd., whom he joined, after two years training in Canada, when their Banbury works was opened in 1931, later becoming assistant works manager. In September 1939, he was given charge of erection and management of the Rogerstone plant. In 1945, as sales manager, he was responsible for reorganising the company's Sales and Sales Development divisions which had been closed down during the war. In 1946 he was placed in charge of the planning and installation of the continuous strip mill at Rogerstone. Afterwards he was transferred to the staff of the director of

operations of Aluminium Ltd., in Montreal, and at the end of 1952 he returned to Northern Aluminium Ltd. as chief engineer, with responsibility for the co-ordination of personnel work.

OBITUARY

Mr. E. H. Lay, a member of the British Thomson-Houston Co.'s Electronic and S.R. sales staff at Rugby, died on May 2. He joined the company as a student apprentice in 1926, afterwards entering the export department. He later transferred to control gear sales until early 1946 when he joined the Electronics and S.R. Sales to specialise in industrial applications of electronics.

Mr. C. W. Buckley, chairman of Santon Ltd. and of Santon (Wholesale) Ltd., died on May 5. He was one of the founders of the former concern in 1920 along with the late Mr. H. C. Sanders, Mr. J. F. Fulton and Mr. H. C. Taylor, which was originally started to put on the market a new instantaneous electric water heater.

Mr. F. W. Brackett, until recently chairman and managing director of F. W. Brackett and Co., Ltd., died on April 30, aged 80. He founded that firm in 1899.

Mr. W. W. Gibbins, chairman of the Birmingham Battery and Metal Co., Ltd., died on May 5, aged 84.

Mr. C. B. Taylor, superintendent of the British Thomson-Houston Co.'s King Edward Factory at Thorne, near Doncaster, died on May 1.

NEW LITERATURE

Alternating Current Wave-forms

by P. Kemp

IT is assumed that the reader of this excellent book possesses a general knowledge of a.c. theory and, therefore, the author wastes no time in coming to grips with complex waveforms. The subject is developed from the viewpoint that, in accordance with the principles of Fourier's theorem, each harmonic in a complex wave may be considered as a separate entity and that a sinusoidal e.m.f. sets up a sinusoidal current.

From an introduction, dealing thoroughly with properties of complex waves, effects of iron and other circuit conditions are considered in detail. In the next stage of development, harmonics in polyphase circuits receive due attention before discussing them with respect to specific circuit components, commencing with the transformer. Harmonics in a.c. machines generally are discussed in two aspects; by considering, initially, harmonics in flux waves and secondly in windings. A section on harmonic analysis completes the book. Second edition, published by Chapman and Hall, 406 pages, size 8½ in. by 5½ in. Price 50s.

Substation Practice

by T. H. Carr, M.Inst.C.E., M.I.E.E., M.I.Mech.E.

SUBSTATION is a term that covers a wide range of installations, from the well-spread e.h.v. outdoor design to the compact factory assembly of switches and transformers operating at medium voltage. The present volume purports to cover them all, and it does, indeed, have something to say on most; but its main concern is with the more moderate sizes, and within this range the author's experiences illumine his writing in a manner that gives confidence to the reader.

The book begins with a general review of the subject, and of the principal types of substation. Civil engineering topics and the layout of the electrical plant are then discussed at length, and there follows a series of chapters on equipment, switchgear, transformers, converting plant and protective gear. Finally, comes a résumé of technical considerations and calculations, and some suggestions for organisation and control in the operation of substations.

For its second edition the book has been brought acceptably up-to-date, and the results of recent experiences have been incorporated. There can be no doubt that it provides a valuable reference volume for the shelf of any electrical engineer. Published by Chapman and Hall, 467 pages, 8½ in. x 5½ in. Second edition, price 55s.

British Journal Photographic Almanac 1953

edited by A. J. Dalladay, A.Inst.P.

THERE are many books of reference so comprehensive and valuable to the user that it is hard to suggest any improvements. Into this category falls the B.J. Photographic Almanac. Yet this work, now in its ninety-fourth year, is completely up-to-date in regard to techniques involved and apparatus used in all branches of the art and science of photography.

An interesting account of mechanisation in the photofinishing industry appears amongst articles concerning photographic topics, whilst 85 pages are devoted to a review of new appliances and equipment. Included are descriptions of much new electronic and electrical equipment.

Again the familiar formulae and instructions for the various processes appear together with a glossary of terms found in current literature. Supplemented by an illustrated advertisement section this volume is worth while for any photographer. Henry Greenwood and Co., Ltd., 608 pages, 7½ in. by 5 in. Price 5s. (board covers) and 7s. 6d. (cloth bound).

BOOKS RECEIVED

Definitions and Formulae: Automobile Engineering, by H. Kerr Thomas and Staton Abbey. Pocket reference book for students. Published by Pitman, 28 pages, 5 in. by 4 in. 2nd ed., price 1s.

Power Cables: their Design and Installation, by C. C. Barnes. General study in the publisher's "Monographs on Electrical Engineering" series. Published by Chapman and Hall, 272 pages, 8½ in. by 5½ in. Price 35s.

The BUYER'S *Column*

The Homeberry—A New Fire

SUITABLE for installation in modern-style fireplaces is this new model electric fire No. 422, the "Homeberry," which has been designed by BERRY'S ELECTRIC, LTD., Newman St., London W.1.

An up-to-date fire

Finished in warm silver with polished rustless radiant heat reflectors; fitted with full heat control by two recessed switches and with a special guard to comply with the British Standard specification on the subject, the fire is sold complete with 6 ft 3-core flexible cable at £8 19s. 6d. plus £4 18s. 8d. purchase tax.

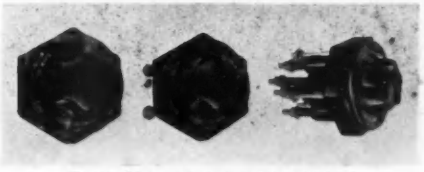
Loading of the rod elements is 2 kW. Dimensions are 18¼ in. wide, 20¾ in. high, 9 in. deep.

Rotary Instrument Switches

THESE switches designed by J. G. STATTER AND CO., LTD., 82 Victoria Street, London, S.W.1, are suitable for connecting in the secondary circuits of current and potential transformers to enable one instrument to be changed from one circuit or phase to the other. Current transformer secondary circuits cannot be open circuited when operating the switch and therefore there is no interference with other apparatus which may be connected in the circuit; also any danger of rise in voltage in an open-circuited current transformer secondary is avoided.

Simple in construction, made from black moulded insulation material with metal inserts, these switches are smooth in operation, correct registration being effected by spring-loaded ball. They are suitable for fitting to panels not exceeding 1 in. in thickness. Bakelite shrouds over the rear connection afford ample protection when the switches are mounted on steel panels.

Stocked normally with standard lettering for ammeter or voltmeter switches, the switches may be supplied with special lettering at an extra charge.



Statter's new instrument switches

A Shuttered 13-amp Adaptor

JUST produced by GRELCO, LTD., Hopcott, Minehead, Somerset, is a very robust 13-amp flat-pin adaptor, list No. F.P.13.

This adaptor has an efficient shutter mechanism affording complete protection and can be supplied fused or unfused. The fuse is easily accessible from the rear of the adaptor and can be easily ejected and replaced without any cover plates to remove and replace.

In a good quality brown plastic moulding with brass pins and components, the adaptor retails at 9s. 6d. fused, and 8s. 6d. unfused. Spare fuses cost 6d. each.

This adaptor is fully shuttered

Price Reductions

FURTHER price changes now announced are tabulated as under for the convenience of our readers:

May 1	Philips Electrical Ltd.	Instant self-start lamps MCFB/U 40 W 4 ft.	Reduced to 15s. 8d. (inc. tax).
May 4	British Driver-Harris Co., Ltd.	"Advance" and "Special Advance" nickel-copper alloys.	Reduction of 2d. per lb.
May 4	English Electric Co., Ltd.	76A Refrigerator	Reduced to £129 (inc. tax).
		4002 Washing Machine	£69 10s.

Short-period Timers

A NEW range of short-period timers for a.c.-d.c. operation has been introduced by ELECTRICAL REMOTE CONTROL CO., LTD., East Industrial Estate, Harlow New Town, Essex.

They all operate on the principle of discharge from a condenser through the coil of a relay, adjustment of timing being effected by turning the knob on the face of the time dial, which alters the value of a resistance connected in series or in parallel with the condenser.

Elremco's timer

The following models of SPT timers have been put into production as standard models—a welding timer SPT/Weld, a conveyor belt timer SPT/CB, a resistance cut-out timer SPT/RC, and make, break, delayed make and break SPT timers.

Meritus L.V. Lighting Units

DESIGNED to provide localised lighting in the factory and workshop, "Meritus" flexible arm lamp brackets have been designed by MERITUS (BARNET) LTD., Wood Street, Barnet, Herts, to withstand the severe handling to which this type of fitting is usually subjected.

The Meritus bench lighting unit is sturdy

Special features are as follows: extreme flexibility of the arms, robust construction involving the use of welding and heavy gauge steel pressings, 320° angle of rotation, specially designed knuckle joints which have triple friction surfaces unaffected by oil or moisture and obviating the need for frequent adjustment; the cable is completely enclosed inside the arms passing through a large hole in the knuckle joints, and the lamp shade is bolted solidly to the head and not secured by the shade ring.

Where the lamp brackets are required for use on machine tools the firm recommends that they should be used in conjunction with the Meritus low-voltage transformer unit. As in our illustration the bracket can be fixed on to the transformer case or separately as desired. In the latter case a special fixing plate is provided.

"Conycote"—A New Winding Wire

TO provide a third type of enamelled wire between the conventional oleo-resinous type to B.S.156 and "Conymel" the company's vinyl acetal type wire to B.S.1844, CONNOLLY'S (BLACKLEY), LTD., Manchester 9, have produced "Conycote," a completely new type of synthetic enamel which has many particular qualities.

In appearance the new wire resembles Conymel but it is darker in colour; it is manufactured at present in the range ·064 in. (16 s.w.g.) to ·0020 in. (47 s.w.g.) in thicknesses of insulation corresponding to Conymel types "F" and "M".

"Conycote" is manufactured from a completely new synthetic resin modified with other thermo-hardening resins to give an enamel having the necessary characteristic qualities.

Tests so far taken indicate that the new wire has a higher temperature rating than Conymel, whilst the new insulation strips easily when dipped in a solder pot at a temperature of approximately 900° F. Wires twisted together whilst insulated will strip and joint at the same time.

Conycote will meet all the tests laid down in B.S.1844 for vinyl acetal insulated wires except for clause 5(*c*)—Hardness of enamel, and clause 5(*e*)—Heat shock.

Now a 15 kW "Autolec" Boiler

BRINGING the advantages of the electrode water boiler for hot water supply for space heating and domestic purposes into the home and small store or café is the new 15kW "Autolec" boiler which has been introduced by G. W. B. ELECTRIC FURNACES LTD., Dibdale Works, Dudley, Worcestershire. This small electrode boiler follows closely the design and principles of the well-known larger "Autolec" boilers, the smallest of which was previously a 30 kW model. The initial cost of the boiler, £77 10s. ex-works, compares favourably with coke and gas units of similar capacities with the much lower installation costs in view of the fact that the unit does not need a flue or chimney and can be placed in any convenient place occupying only 15 in. dia. floor space.

The 15 kW Autolec

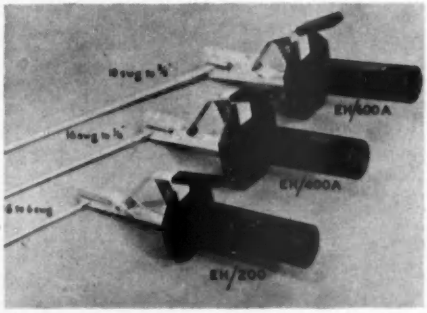
This new water heater has an output of 51,000 B.T.Us per hour, and can, we understand, produce 30 gallons of water at 160° F in 2¼ hours. The boiler shell is equipped with all standard connections, outlets, vent pipes, and is fitted in an outside case finished cream stove enamel with chromium plated fittings.

New Welding Electrode Holders

THREE new electrode holders have been produced by the QUASI-ARC CO., LTD., Bilston, Staffs., which are suitable for all sizes of electrodes from 16 swg-⅜ in.

The jaws of the new holders are made from a special wear-resisting copper alloy and slots are provided to give five welding positions.

The holders have a tough pressed steel body to resist distortion, current being conducted to the



These are the new electrode holders by Quasi-Arc

top jaw by flexible copper strips to avoid arc-ing at the hinge pins.

Handles and guards are of tough non-hygroscopic fibre, the handle being knurled for additional comfort. Metal parts of the holders are cadmium plated to resist spatter and rust.

The three holders are Type EH/200 suitable for welding currents up to 200 amps and electrode sizes 16 to 8 swg, type EH/400A suitable for currents up to 400 amps and electrodes 16 swg to $\frac{1}{4}$ in. and type EH/600A for welding currents up to 600 amps and electrode sizes up to $\frac{1}{2}$ in. diameter.

Coronation Decoration Lamps

CONVENIENT packs of Osram red, white and blue decoration lamps have been produced by the General Electric Co. Ltd., Magnet House, Kingsway, W.C.2, to enable existing Christmas-tree sets of coloured lamps to be re-lamped for the Coronation.

With these packs, twelve 20 V 3 W olive-shaped lamps comprising four of each colour are contained in a neat and attractive display carton.

The price of the box of twelve lamps is 14s. 6d. including purchase tax or 1s. 2½d. (inc. tax) each.

Single Coil Silica-coated Lamps

BECAUSE of the success achieved by internally silica-coated lamps the ELECTRIC LAMP MANUFACTURERS' ASSOCIATION announce that as from June 1, 1953, their members will be marketing the 40, 60 and 100 W lamps with single-coil filaments in addition to the present lamps with coiled-coil filaments.

The list prices will be 1s. 6d. for the 40 and 60 W lamps, and 2s. for the 100 W lamps (plus purchase tax).

E.L.M.A. members will continue to market these ratings with coiled-coil filaments which, they claim, give up to 20% more light than the corresponding single-coil lamp.

TRADE PUBLICATIONS

ELECTRIC FENCING.—A booklet is available from the Wolseley Sheep Shearing Machine Co., Ltd., Electric Ave., Witton, Birmingham 6, which gives full particulars of various tried and tested schemes for enclosing pigs.

MOTORS.—Brush induction motors from 1-80 b.h.p. are now being built at the Cardiff works, and this particular range is described in leaflet No. 11002 recently issued by the Brush Electrical Engineering Co., Ltd., Loughborough.

TELECOMMUNICATIONS.—Some of the special services available to users of Strowger Private Automatic telephones are described in a leaflet issued by Communication Systems, Ltd., 8 Arundel St., London W.C.2.

FLUORESCENT LAMPS.—"The facts (and figures) behind the outstanding performance of Atlas 'double life' fluorescent tubes" is the title given to a recent publication by Thorn Electrical Industries, Ltd., 105 Judd St., W.C.1.

ACCESSORIES.—Recent additions to the range of Tucker accessories are featured in a current booklet issued by J. H. Tucker and Co., Ltd., King's Road, Tyseley, Birmingham.

DOMESTIC APPLIANCES.—The DA499 Kettle and the firm's new boiling ring are described in two handbills just published by Metway Electrical Industries, Ltd., King St., Brighton.

METAL ALLOYS.—Revised data concerning Wilco-Wiggin Thermometal has been issued by Henry Wiggin and Co., Ltd., Wiggin St., Birmingham 6, in the form of folder sheets for insertion in the company's handbook.

CONTACTOR STARTERS.—Four new leaflets K140, K150, K160 and K170, each describing some of the industrial type contactor starters built by the company are now available from the Belmos Co., Ltd., Bellshill, Lanarkshire.

TELECONTROL SYSTEMS.—Control Desks for these systems built by Standard Telephones and Cables, Ltd., Oakleigh Road, New Southgate, London N.11 have been described in brochure D/RC23 available from the firm.

DECORATION LIGHTING.—Leaflets are available from Smart and Brown (Engineers), Ltd., 8 Rose and Crown Yard, King St., S.W.1, giving details of the various lighting equipments and fluorescent tubes.

ELECTRICITY IN MILLS.—The application of electricity to the spinning industry of Northern Ireland is the title of an illustrated brochure which has been published by Metropolitan Vickers Electrical Co., Ltd., Trafford Park, Manchester 17.

LIGHTING.—Hi-Craft fluorescent troughs are featured in a leaflet issued by Smart and Brown (Engineers) Ltd., 8 Rose and Crown Yard, King Street, St. James's, London S.W.1, and branches.

INSTALLATION SUPPLIES.—A new price list of wiring and lighting accessories has been published by Reeves and Co. (Birmingham) Ltd., Crescent Works, Birmingham, and is available also from the London office, 40 Bloomsbury Street, London W.C.1.

STAGE LIGHTING.—A wealth of information is encompassed in the new 40-page catalogue of stage lighting equipment and control gear which has been issued by Stage Electrical Equipment Ltd., 138 Wardour Street, London W.1.

PRECISION INSTRUMENTS.—Valve maintained timing forks are produced by Muirhead and Co., Ltd., Beckenham, Kent. Types D.630 and D.639 are described in new brochure 4701-B.

CONDENSERS.—Latest Technical Bulletins issued by Telegraph Condenser Co., Ltd., North Acton, W.3—Nos. 31 and 32—are concerned with "Plastapack" plastic film condensers and h.v. tubular ceramic condensers.

The WEEK in NEWS

Power Station Plan Rejected

B.E.A.'s 2½-year Struggle for Consent to Build at Machen

FOR the first time a site selected by the B.E.A. for a new power station has been rejected. The Authority was informed by the Ministry of Fuel and Power last week that after considering evidence given before a Public Inquiry, consent could not be given to the building of a new power station at Machen (Mon). First steps in the long procedure to obtain necessary approval and consent for a station at Machen were taken in December 1950, nearly 2½ years ago. Alternative arrangements will be made, but it is likely that under present-day conditions the repeated procedure will take a further two years before permission is finally received. Following the rejection of the Machen proposal, the B.E.A. pointed out that since they had been precluded from carrying out the scheme considered the most technically advantageous and economical, the alternative plan was certain to be more expensive.

At the Public Inquiry in February the main objection was the detrimental effect the new station would have on the rural amenities. The site had been reserved, it was stated, as an agricultural area.

Broadly, a new power station probably takes about five years to construct, the most lengthy delays taking place at the stage of obtaining consents. Local authority, county planning and C.P.R.E. are among the prominent bodies concerned, with the comparatively recent addition of the Rivers' Pollution authority. Some early examples of the time taken for consent are that in the case of Bromborough it took 2½ years, Rye House took nearly 3 years. Braehead took just over a year and Poplar 14 months. Procedure cannot be said to have shortened since those power stations were built.

B.E.P.C. PREVIEW

THREE of the principal speakers at this year's British Electrical Power Convention gave a preview of their papers at a Conference held last Thursday at the Waldorf Hotel, London. They were Col. B. H. Leeson, who will speak on electricity in relation to national prosperity; Mr. E. R. Wilkinson, whose subject is to be "Electricity and Industrial Production," with special reference to productivity, and Mr. S. F. Steward, who in his paper will link up the theme of Britain's dependence on electricity for prosperity with the paramount need today for increased home food production.

Sir John Hacking, the B.E.P.C. president, hopes in his address to cover the steps the B.E.A. are taking to improve efficiency, and the prospects of nuclear power generation.

NEW ELECTRICAL FACTORIES IN U.K.

NEWS has reached us this week of plans to build two new factories for manufacturing companies in the electrical industry. The first is at Larne, in N. Ireland, where the British Thomson-Houston Co. Ltd. are to make components associated with turbine production. This will provide additional capacity to cope with heavy demands for heavy electrical plant. First stage of the plans will cover about 82,000 sq ft and employ about 250 people, although the work done will almost certainly lead to increased employment at Rugby. In the meantime, temporary premises have been rented to train personnel and start production.

The second factory is to be built in the new N.E. Lancashire Development Area by North-Western Industrial Estates Ltd., and is to be let to Mullard Ltd. for the manufacture of cathode ray tubes. These premises, recently approved by the Board of Trade, will cover some 250,000 sq ft and facilitate the transfer of much of the existing production from London. Mullards already have a factory at nearby Blackburn.

The First Half-Century

Several manufacturers of electric carriages have expressed a wish for trials of their vehicles to be held quarterly, extending over a long distance each day, on much the same lines as those now in force for petrol cars, and at the recent meeting of the electrical advisory committee at the Automobile Club, a sub-committee was appointed to consider the question. If their report be favourable, periodical 100-mile trials of electromobiles will be held under the auspices of the club. It is often urged against the electric carriage that it is not sufficiently trustworthy for continuous everyday use, and that the cost of running and maintenance is prohibitive when compared with petrol or steam cars. The proposed quarterly trials would, however, do much to remove this false impression.—*From our issue of May* 14, 1903.

A.P.L.E. Conference in Liverpool this Year

PRELIMINARY programme for this year's conference of the Association of Public Lighting Engineers, which is to take place in Liverpool, has just been issued. St. George's Hall is to be the headquarters, and also the site for the usual exhibition; the conference itself will take place in the Picton Hall, opposite, while the display of lamp columns, bollards and tower wagons will be in adjoining St. John's Gardens. Annual meeting and official opening on September 15 will be in the Philharmonic Hall. The conference closes on September 18.

Five papers are to be read during the four days. They include: "Criteria on the Quality of Street Lighting," by Mr. J. B. de-Boer; "Design and Manufacture of Street Lighting Lanterns," by Mr. M. H. Mounsdon; and "Public Lighting in Belgium," by M. André Boereboom. The Presidential address by Mr. C. C. Smith will be on the Tuesday afternoon, the Lord Mayor's Civic Reception the same evening, and the President's reception on Thursday evening.

Other notable events include the annual luncheon, a river cruise on *Royal Iris*, and an inspection of the city's street lighting installations, all of which take place on the Wednesday. Additional plans have been made for the entertainment of the ladies.

I.E.E. Open Later in Coronation Week

INSTEAD of closing their premises at the usual time of 6 p.m., the Council of the I.E.E. has arranged that the building will remain open for the use of members and their guests during Coronation week until 11 p.m. Admission during those evenings, however, will be by ticket only, which may be obtained for any of the four days—June 2 to 5—not later than one week beforehand. Each member may have four tickets at 2s 6d each, which will also cover the cost of buffet refreshments.

Cooker Competition

WELL over 10,000 entries were received in the All-electric Ideal Home Competition run by British National Electrics, Ltd., Contestants were asked to place ten illustrated features of the firm's C.49 cooker in the order of merit from the point of view of efficiency and labour-saving in the kitchen. Although such a competition might be deemed perfect for the housewife to express her views, most entries were submitted by men and the winner was in fact a Folkestone gentleman. The best entry in the junior section came from a 10-year-old of St. Annes-on-Sea. Most popular features were: Even Oven Temperatures, Easy Cleaning, Strength, Drop-down Oven Door and Interchangeable 2- or 3-plate Hob.

N.Z. Announces Import Concessions

IT is reported from Wellington that licences are no longer required for the import of some electrical items from certain specified countries. Included in the quite formidable list of goods are switchboards, distribution boards, voltage regulators, condensers, circuit-breakers, wall-plugs, and various switches. This relaxation will apply to the U.K., but several countries have not been included in the scope of the concessions, notably Canada and the U.S. Others include Russia, Yugoslavia, Japan and Uruguay.

COPPER LICENCES

THE Minister of Supply has now made the necessary order to cope with the buying or selling of copper after the return to free dealings in August. The order, which came into effect last week, allows offers or contracts for delivery after the end of public trading to be made without a licence. Licences will, of course, still be necessary while public trading continues.

Industry told to Speed Deliveries

SPEAKING at last week's luncheon given by the B.I.F. Management Committee to representatives of the electrical industry, Mr. D. D. Walker, chairman of B.E.A.M.A., referred to the artificial limitation on the sale of electrical goods. The salesman, he said, had spent the past 15 years apologising for deliveries. In the future salesmen would have to start teaching the housewife how to use electricity, and at the same time try to overcome the effect of much anti-electricity propaganda. Mr. Walker also expressed appreciation of the reduction in purchase tax but sought the removal of the differentiation between electrical and other appliances. The public should be allowed to decide which fuel was best for their particular purposes.

Also present at the luncheon was the S. African High Commissioner, the Hon. C. H. Torrance, who urged manufacturers to speed up deliveries. The country's industrial development programme depended to a large extent on quick delivery of vital electrical plant. Deliveries had been bad but were improving, he added.

Electricity on the Racecourse

VISITORS to the racecourse at Redcar may well be accustomed to the many innovations brought into effect there at recent meetings. An additional attraction expected to be in operation at the Whitsun meeting will probably interest electrical engineers. This latest innovation involves the electrically operated timing of races. Cables have been laid from all starting gates to the winning-post. As the starter presses his lever, the timing will begin and will be registered on a large clock situated at the finishing post. Spectators will be able to see the pointer moving round the clock as the race is run.

Electricity Afloat in 1952 — Lloyd's Report

ADVANCES in many branches of marine engineering which are of electrical interest are noted in the annual report for 1952 of Lloyd's Register of Shipping. In particular, a growing preference is noted for a.c. electrical systems on shipboard, particularly in tankers. The tendency appears to be towards standardisation on 440 volts, 3 phase, 60 c/s. In recent months 50% of the total rating of generating plant for new ships has been a.c., whereas a few years ago a.c. was almost unknown.

The analysis of world shipping by method of propulsion, which is a regular feature of the report, shows that out of a total gross tonnage of about 90 m., there is 5.1 m. tons of turbo-electric shipping and 0·2 tons of diesel-electric. The slow decrease in the total of turbo-electrically driven shipping which has been apparent since 1948 continued, the 1952 figure being 22,665 tons down on that for 1951.

Steam conditions in turbine ships have not generally advanced beyond 850° F, but it is noted in the report that several ships recently completed are designed to operate at 950° F.

An increasing amount of non-marine work is being undertaken by the society. Included in this is a power station at Kuwait, and one at Sariyar, Turkey, for which the society will survey all the materials and plant. Survey and inspection work continues for the H.E. Commission of Tasmania, and for the Snowy Mountain project in Australia.

Extension and amendments to the Rules of Lloyd's Register continued to occupy much attention and progress was made in the unification of these with the British Corporation Register. In this connection, the approval is noted of revised chapters L and M, electrical propelling machinery and electrical equipment.

SMOKE ABATEMENT

SINCE the abnormal fog last December interest in air pollution has increased considerably. Those who have latterly become concerned with the problem may well wish to join others in studying the National Smoke Abatement Society's Year Book for 1953. Apart from facts about the Society, it gives information on the legal side, measurement of pollution and the work of Government Departments, recent extracts from the Simon and Ridley reports, and information on last December's fog.

OFFICIAL PUBLICATIONS

COPPER, LEAD AND ZINC DISTRIBUTION (Amend. No. 3) ORDER H.M.S.O. 2d. (See page 929).

GAS. *Report of Anglo-American Council on Productivity.* Price 8s. 6d.

BRITISH STANDARD. *Amend. Slip C.P.342: Centralised domestic hot water supply, PD1588.*

STATEMENT OF GUARANTEE by Treasury on April 20 on Stock issued by B.E.A. H.M.S.O. 2d.

Scientific Film Festival

THE seventh congress of the International Scientific Film Association and usual Festival of Scientific Films is to take place in London between September 18 and 27. It is, of course, important that this country be well represented in the film festival, and the Association asks producers to supply copies of their films for viewing in good time. In addition, the Association would like details of research and record productions of specialised types for showing at meetings of the Permanent Committees dealing with technical and industrial films.

Electrical Economies in Council Houses

FACED with rising costs of building, local authorities have been looking about in recent months for suitable methods of effecting economies. Some decisions have inevitably fallen on the electrical installations and kindred appliances. At the recent meeting of Edinburgh town council it was proposed to omit gas and electric cookers from new houses and supply only the points. This follows the council's earlier decision to take away wash boilers. Main argument in favour seemed to be that while prices continued to rise it was essential to seek first those economies which would not affect housing standards. The meeting finally decided the suggestion be taken back for further consideration.

In London, the L.C.C. Housing Committee is recommending that gas or electric wash boilers be left out of Council dwellings. It is explained that the measure is partly for economy and partly because some tenants never use the appliance. No more communal laundries will be included in new schemes, but instead a drying cabinet will be installed together with a gas or electric point for wash boilers. Some houses will be provided with individual central heating.

Carnival Time? No, just workmen carrying two G.E.C. Chrysaline lighting fittings along Regent St. for installation as part of the street's Coronation decorations. About 1,000 of these Tudor roses are to be employed

ASSESSMENT OF E.R.A. RESEARCH LABORATORY

ASSESSMENT for rates of the E.R.A.'s establishment at Perivale has been the subject of dispute for some months now. Until last year it was assumed that, as a scientific research establishment, it was exempt from rating, and only some ancillary sections were rateable. Then, however, the Court of Appeal decided the exemption applied only to places where research was carried on for the benefit of the whole community. Total assessment on the premises was then fixed at £1,870, but E.R.A. countered by claiming that if it was rateable, then it was an industrial hereditament and should be derated. The Valuation Court now holds that the bulk of the hereditament is subject to derating. Pending any further appeal, the parties have agreed to figures on that finding. Rateable value of the industrial part is £360, and the non-industrial part, £184.

First Tariff Increase in South West for 2 Years

ELECTRICITY prices in the S. Western Electricity Board's area are to go up shortly. The price of the first block of units in the domestic and other block tariffs is to be increased by ½d. to 5½d., and the running rate will be raised from ¾d. to 1d. a unit. The Board's chairman has explained that the increase has been kept to the minimum necessary to meet the additional expenditure which has to be borne immediately. The rectification of past deficits has been left untouched, pending the result of investigations carried out by a Joint Panel set up by the B.E.A. to consider conditions in the area. The Board has endeavoured to keep prices steady during the past two years despite rising costs of coal, wages, and bulk supply charges. Some minor adjustments are to be made in the industrial tariff. The Board will ratify the new charges at their next meeting.

Mercury vapour lighting at the Round Oak steel works at Brierley Hill, Staffs. British Thomson-Houston Co. supplied nearly 100 lanterns housing 400 W mercury lamps which were mounted on 25-ft concrete columns or wall brackets

Fifty Years' Progress with Aluminium

Birmal Celebrates its Jubilee

FIFTY years of progress in the industrial application of aluminium were celebrated in Birmingham last week. The occasion was the Golden Jubilee Dinner of Birmal, the Birmingham Aluminium Casting Co. (1903) Ltd. Parent firm of this well-known company was the Hydraulic Joint Syndicate, formed in the late 1890's to produce bicycle frames without brazed joints. By 1901 an aluminium business was firmly established, and in 1903 the style of the company was changed to its present form.

Lord Burghley, K.C.M.G., the present chairman of the Company, presided at the dinner, which was attended by a large gathering of business friends and associates of Birmal. The toast of the Company was proposed by J. J. Gracie (general manager, G.E.C. engineering works, Witton). In a brief and witty speech, which set the tone for those that followed, he described Birmal as a pioneer and a child of Birmingham. The company's story was largely that of aluminium; but, like all great firms, it was made possible only by the work of great men, and he paid tribute to many of those outstanding in the company's history.

Mr. E. Player, Joint Managing Director of Birmal, replied to the toast, and added his tribute to those who had led the company in earlier years. He described foundries as the foundation of industry but like all foundations, likely to be taken for granted and forgotten. His fellow Joint Managing Director, Mr. J. W. Berry, proposed "The Guests," and gave as the present call to industry, "we want to increase the incentive to buy."

Two New Lighthouses

NEWS has reached us this week of the commissioning of two new lighthouses. One is at Teignmouth where a new beacon has been installed at the entrance of the harbour as a memorial to a Mr. P. A. C. Lucette who died there in 1949. It is a three-lamp lantern on a concrete structure. Power supply is through a 660 V submarine cable made by British Insulated Callender's Cables, and installed by the S. Western Electricity Board.

The other lighthouse is on far-away Corregidor island of wartime fame, and has been equipped by Chance Bros. It is powered by electricity instead of oil, and generators are powered by a diesel engine, either duplicated or triplicated. Standby lamps and plant are brought into operation automatically on the failure of the normal equipment.

Rail Electrification on Tees-side

A REPORT prepared by Mr. T. H. Summerson, chairman of the Tees-side Industrial Development Board's Industrial and Services Committee, states that the scheme to electrify the district's railway system is not feasible. Three years ago the Board urged British Railways to electrify the system. Mr. Summerson states that passenger traffic is not heavy enough to justify the initial expenditure, which would be so great that economies on fares would only be possible if a really intensive service was given. The report suggests that diesel-electric trains would provide faster and cleaner services, could be introduced gradually, and could be used for freight as well as passenger traffic.

NEWS IN BRIEF

The Building Plant Exhibition for 1953, organised by the Ministry of Works, will be held on the Goose Fair site at Nottingham between September 3 and 9.

A joint committee representing principal national retail organisations has agreed to seek the support of M.P.s of all parties for the inclusion of a new clause in the Finance Bill to allow a scheme to be prepared for the reimburstment of traders in the event of reductions in purchase tax.

Directors of Switchgear and Equipment Ltd. gave a dinner and dance at Banbury recently to celebrate the company's 21st birthday.

Over 100 Kenwood dealers attended a recent Dealers' Forum and Convention organised by Furse Wholesale, Ltd., and Kenwood Electrics, Ltd., in Nottingham.

A colourful and inspiring souvenir brochure to commemorate the opening of Connaught Bridge power station has been received from the Central Electricity Board of Malaya. The 30 pages give an admirable account of this project.

Electrical Husbandry

WE have been asked to point out that in the reference to artificial illumination of tomatoes on page 863 of our May 7 issue in the article headed "Electrical Husbandry," the increase of ½ lb. of fruit per plant is obtained during the first month of fruiting and is equivalent to an increased return of £500 per acre, not 500 lb. as stated.

Questions in Parliament . . .

Anglo-Brazilian Trade

Replying to Maj. Beamish, the President of the Board of Trade stated that Brazil intended to pay sterling arrears on British goods exported to that country at the official rate of exchange despite their Exchange Law enforced in February.

Atmospheric Pollution

What gaseous elements in fog, besides sulphur dioxide, for example: nitric oxide, were analysed as a routine matter in London, asked Dr. Jeger last week. Mr. H. Macmillan replied that sulphur gases were measured at a number of London stations, but other elements were comparatively small and to measure them would be both difficult and expensive. On the following day, Dr. Jeger asked whether there was any other information on the components of fog which caused so many deaths last December. Miss P. Hornsby Smith said there was insufficient evidence to incriminate particular components as the cause of death, but investigations were continuing.

Census of Production

The President of the Board of Trade has appointed a committee to advise and make recommendations on the future policy in regard to taking censuses of production and distribution. Mr. W. R. Verdon Smith has agreed to act as chairman. In two supplementary questions it was pointed out that any diminution in requirements of the census would be greatly welcomed, and that any cutting down in the information derived would be a serious loss. To which Mr. Strauss replied by giving an assurance that his Departmen was aware of the importance of adequate statistical information, and also that the gaining of that information should be with the least interference.

Science and Technological Graduates

The number of science and technological graduates who qualified in Scotland during the academic year 1951-52, had been estimated at one in 2,500 of the population, Mr. J. Stuart told the House last week. He could not say what number of vacancies had been filled by persons with such qualifications.

Coal Administration

The Prime Minister told the House on Friday that he did not consider the appointment of a supreme minister for coal, responsible both to the House of Commons and for the administration of the N.C.B and the coal industry, would be wise.

Rural Electrification

Mr. Joynson-Hicks told the Commons on Monday that the Government did not make specific allocations for rural supplies. This year's allotment was epected to permit increased rural electrification, he said.

Industrial Efficiency

The Minister of Fuel and Power is expected to make a statement soon on the setting up of an industrial organisation to provide a fuel efficiency service. He has received the Pilkington Committee's report.

Electric Supply News . . .

Belfast

An additional 30,000 kW turbo-generator at the Corporation's Harbour power station, was officially inaugurated last week by the Lord Mayor of Belfast, Councillor J. H. Norritt. The set has actually been on load for some weeks. This addition completes the station, which is now the largest in Ireland (its capacity is 174,750 kW). Mr. R. P. Watson, the acting city electrical engineer and manager, claimed at the switching-on ceremony. He said they were preparing for the opening of another chapter in the history of the Belfast undertaking across the Musgrave Channel where the first section of the new Victoria power station would be ready for commissioning next year, it was hoped.

Northampton

The Corporation Markets and Town Hall Committee has been informed that when electric mains are laid round the Market Square, a feeder main will be laid from the east side of the square to the fountain. The East Midland Electricity Board has inquired whether at some future date the market stalls will be lit by electricity, in which event they are prepared to lay a main capable of carrying the increased load. The cost to the committee will be the difference between the cost of the original main and the heavier main to be substituted. This offer the chairman of the committee has authorised to be accepted.

Northern Ireland

The Electricity (Supply) (Amendment) Bill has passed through the Committee Stage in the Ulster Senate without amendment. During discussion, Col. Gordon, Leader of the House, said there was no question of a Government subsidy; electrification of the countryside must be an economic proposition. The guarantees would be realistic in that they would be related to the capital cost of the installation. Earlier, in moving the second reading, he said the Government were confident that the Bill represented the best available method whereby electrical development could be pushed forward in rural areas at the fastest rate consistent with economic prudence. The object of the Bill, he said, was to restore to electricity undertakings the powers of which they had been deprived; namely, the right to require a guaranteed level of revenue or a capital contribution towards the cost of making a supply available.

Shetlands

Bressay, one of the Shetland Islands, has received its first electricity supply, and the first subscriber, a herring-gutting factory at Heogan, was connected up last Thursday, under the scheme of the North of Scotland Hydro Electric Board. Supply is obtained from diesel generating plant at Lerwick, via a submarine cable, approximately 500 yards long across Bressay Sound. The cable—a 3-core ·04 sq. in. 11 kV p.i.l.s.s.w.a., made by B.I.C.C.—was laid by the British Insulated Callender's Construction Co. for the Board. This is the third of the islands which the company have connected with the mainland by submarine cable.

Stanley (Co. Durham)

The North-Eastern Electricity Board have completed arrangements for taking over low voltage networks in the area, hitherto controlled by the National Coal Board. The Electricity Board are carrying out a survey in connection with improvements to the system. The work involved will take about five years to carry out. The Board have stated that it would be three years before electricity could be supplied to Craghead.

Suffolk

A proposal of the Eastern Electricity Board to erect an overhead line from Ipswich to Felixstowe has been agreed to by the East Suffolk County Planning Committee. The proposed route for the line is from Warren Heath sub-station at Ipswich, over the Ipswich-Felixstowe road to Nacton Heath, and then across the approach roads to Nacton and Levington from the main Ipswich-Felixstowe road, through the parishes of Stratton Hall and Trimley St. Mary to Langley Avenue, Felixstowe.

Swindon

May 30 next will bring the golden jubilee of the Corporation electricity undertaking. When the power station at the corner of Corporation Street and Manchester Road commenced operation in 1903 its output was 57 kW. The capacity of the present station at Moredon, which was commissioned in 1929, is 35 MW.

LIGHTING SCHEMES

Chislehurst and Sidcup.—Approval of M.o.T. being sought to improved lighting in four main traffic routes, at a cost of £10,000.

Hornsey.—The Council has decided to light side streets with sodium lamps.

Macclesfield.—The borough engineer, Mr. J. H. Dossett, has submitted his report on the cost of complete electrification of the town's street lighting system. The lighting sub-committee decided that the policy of electric lighting of the main traffic routes be continued and that the matter of all-electric lighting be reviewed when the main roads have been dealt with.

Newport (Mon.)—The T.C. is recommended to borrow £5,015 for the installation of street lighting at various housing estates.

Oldbury.—The council is planning a large street lighting improvement scheme, to be spread over several years, and has authorised an application for consent to borrow £28,300.

Company Activities . . .

Aberdare Cables (Holdings)

The net profit for the year ended October 31 last is £141,541, an increase of £43,220 over the previous year, according to the preliminary statement. The dividend is 25% (20%). The directors state that application is being made to the C.I.C. for permission for a capital bonus of one-for-one.

Atlas Electric and General Trust

Net revenue after all charges, including taxation, is £306,429 for the year ended March 31 last. The previous year's figure was £279,918. It is proposed to raise the dividend 1% to 6%.

Automatic Telephone and Electric Co.

For 1952, the group net profit, before taxation, amounts to £1,137,917 which compares with £1,545,399 for the previous year. With a final Ordinary dividend of 12%, the total distribution for the year is again 15%, but this time on increased capital.

Babcock and Wilcox, Ltd.

Shortages in the supplies of steel and other components especially during the first nine months of 1952, prevented the record production of 1951 being attained. But in spite of keener

Year to Dec.31	£ Trading Profit	£ Net Profit*	% on Ord.		Ord. Price	
			Earn'd	Paid	High	Low
1948	2,199,604	858,774	36	15	75/6	63/-
1949	2,749,081	1,066,505	38	15	75/3	55/3
1950	5,141,128	1,530,343	60	18	67/-	55/9
1951	6,392,261	2,010,234	99	18	83/3	66/9
1952	5,788,578	1,337,297	68	18	72/6	59/3

* Attributable to parent company.

world competition export contracts secured surpassed in value those gained in any previous year, states Mr. W. L. Fraser, chairman. Production has already begun at the first section of the works at Vereeniging, South Africa. Referring to the bank overdraft of £3,200,000, he states that having regard to the rising cash requirements involved in this period of inflation and high production at home and overseas, and to the probability that these conditions may prove to be abnormal, the directors have decided that it is in the best interests of the company that the position should continue to be financed by temporary bank advances.

British Thermostat Co.

The total dividend for the year ended January 31 last is being raised by 5% to 35%, with a final of 27½%. After charging taxation and depreciation, the group profit attributable to the parent company is £150,097 compared with £116,953 for the previous year, according to the preliminary statement. Application is being made to the Capital Issues Committee for permission to make a scrip issue of one for one.

Brazilian Traction Light and Power Co.

For 1952 the net profit increased by over 19% to a total of $42,169,630, the full accounts show. The Ordinary dividend is again $1 (Canadian) per share.

Dictograph Telephones

An extra-ordinary meeting is to be held on May 21 to approve proposals to capitalise £50,000 of reserves and to make a one-for-five Ordinary scrip bonus. It is also proposed to raise the capital to £500,000 by the creation of 1,500,000 two shilling Ordinary shares (not 2% as we stated on April 23) which will be absorbed by the bonus issue.

Drayton Regulator (Holdings), Ltd.

Although during 1952 the orders received slightly decreased, the value of output increased by approximately 15% over that of 1951, according to Mr. B. T. Wingfield, the chairman. But for

Year to Dec.31	£ Trading Profit	£ Net Profit	% on Ord.		Ord. Price	
			Earn'd	Paid	High	Low
1949	126,610	52,416	121	15	4/9	4/3
1950	178,751	63,951	156	30	5/4	4/6
1951	192,879	71,475	175	30	7/3	4/11
1952	190,529	58,660	137	32½	7/4	4/6

many types of the company's products there has been a slackening of demand during the last six months, and unless this trend is reversed, the turnover for 1953 must fall, with a consequent decrease in profits. It is hoped, however, that the trend will be reversed when the concessions given to industry in the Budget become effective.

Elliott Brothers (London) Ltd.

Dealings are expected to begin today, May 14, in the £250,000 6% First Mortgage Debenture Stock, which were "placed" through Philip Hill, Higginson and Co. Application was earlier made for a Stock Exchange quotation. At the same time the company's 4½% Redeemable Preference £1 shares and Ordinary 5s. stock units are being "introduced" on the market, although it is expected that few will be on offer.

H. J. Enthoven and Sons

This solder firm reports a consolidated profit for 1952, after all charges, of £235,739, compared with £449,905 for the previous year. The dividend is again 30%.

Harland Engineering Co.

The net profit for 1952, after all charges, is £70,511, compared with £65,955 for the previous year. The dividend is again 10%.

W. T. Henley's Telegraph Works Co.

There is a reduction in the net profit for 1952. At £522,398 the total is £124,049 down on the

previous year. It is emphasised, however, that the reduction is due to the loss sustained by a subsidiary, but which one is not indicated in the preliminary statement. The final Ordinary dividend is 8% on capital which has been twice increased during the year. With the interim of 5%, this makes a rate equivalent to 10½% for the year on the Ordinary stock at December 31 last.

Lacrinoid Products Ltd.

The net trading profit, etc., for 1952 amounts to £20,027 (*£59,688*), and the net profit is down to £2,556 (*£30,649*). The dividend also has been reduced from 15% to 5%. Mr. T. L. Horabin, the chairman, states that in the first three months of this year, net profits in excess of £9,000 before taxation have been earned, and the board is confident that net profits will continue at that rate for the first half of the year.

Laurence, Scott and Electromotors Ltd.

The increase in the gross profit in 1952 was achieved by a marked increase in production, partly due to improved material supplies, states Mr. G. H. Wilson, chairman and managing

Year to Dec.31	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1948	323,876	104,645	40	12½	15/3	9/3
1949	381,269	134,403	53	12½	15/-	12/-
1950	431,313	134,063	55	12½	14/1	12/6
1951	49 ,122	168,707	72	15	16/6	12/3
1952	593,605	185,313	79	15	13/6	9/9

director. But during the current year there has been a marked and general decline in the small motor business, due to a variety of causes, and Mr. Wilson believes that there is now a manufacturing capacity in this country for this class of machine which may well prove to be excessive for normal trading conditions. But this company has so far been successful in turning its activities into other more specialised fields. The incoming orders in 1952 did not quite reach the record figure of the previous year, he adds, but the total was still substantially above that of the deliveries and the total work on hand was greater at the end of the year than on any previous occasion.

Metropolitan Cable and Construction Co.

The trading profit for 1952 after charging depreciation, etc., amounts to £137,318—almost double that of the previous year—but after taxation the net profit becomes £46,476 (*£43,181*). The dividend is doubled to 50%, the sum of £10,000 (*£25,000*) is placed to general reserve, and £15,000 (*nil*) to assets replacement.

Ozonair Ltd.

This firm of air-conditioning and general engineers reports a slight increase in profits. For 1952 the trading profit amounts to £20,769 as against £19,049 for 1951. The Ordinary dividend is 8⅓% (*same on small capital and* 4⅙% *on £5,000 new capital*), plus 1⅔% bonus (*nil*). The directors state that it should not be assumed that the bonus will be repeated.

Parnall (Yate), Ltd.

Although the group profit for 1952 at £37,994 is a sharp reduction from the previous year, these manufacturers of washing machines, cookers, wringers, etc., are again paying a dividend of 6%. The 1951 profit figure was £140,900, but in arriving at the 1952 total, excess cost of stocks of raw materials, contracted by a subsidiary before 1952, amounting to £34,856, has been charged to contingencies, according to the preliminary statement.

C. A. Parsons and Co., Ltd.

Production of turbo-generators and transformers reached new record output levels during 1952. In fact, during 1951 and 1952 this company commissioned throughout the world over two million

Year to Dec.31	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1948	472,955	198,735	56	12½	70/-	59/-
1949	1,099,354	466,906	137	15	66/3	56/3
1950	1,726,299	706,589	220	15	77/-	57/6
1951	2,513,828	1,067,452	167	13⅓*	58/6	37/6
1952	2,526,393	834,598	125	12½	55/6	43/-

* Plus capital bonus 100%.

kW of turbo-generators, and in both years made the biggest contribution to the new plant for the B.E.A., Sir Claude Gibb, chairman and managing director, claims. Orders both for home and overseas during last year were at a high and satisfactory level, but there are signs of stiffening competition in overseas markets, he adds. The new large transformer bay is now in full production, and the research and design buildings are practically completed. A small works to manufacture condensing and feed heating equipment is to be established in South Australia, and construction of the first section of the factory will commence this year.

Southern Areas Electric Corpn. Ltd.

After charging depreciation, etc., the consolidated profit for 1952 amounts to £220,534—almost double the previous year's total. The net profit, after deducting minority interests, is £82,460 (*£34,167*). The dividend is 5% (*same*), plus a bonus of 1%.

Worthington-Simpson

The net profit for 1952 amounts to £239,603, as against £217,363 for 1951. The final dividend is 10%, making 20% (*both same*), but on capital increased by a 10% share bonus. A free scrip issue of 96,000 new Ordinary 10s. shares to holders is proposed.

Dividends Declared

Telephone Rentals.—Final dividend of 6% (*same*) but on larger capital, again making 10%.

Tube Investments.—Interim Ordinary dividend of 7½%.

Commercial Information

CONTRACTS OPEN

HOME

May 15.—Chorley (Lancs). (*a*) Supply, erection, etc., of 113 sodium lighting units; and (*b*) supply of lanterns and electrical apparatus for same, along about 3 miles of trunk road A.6. W. Groves, Engineer and Surveyor, Council Offices, Gillibrand St.

May 15.—Dublin. Renewal of electrical distribution system in Hospital 3, St. Kevins' Institution. Nicholas Mathews, Consulting Engineer, 42 Fitzwilliam Place. Deposit £10 10s.

May 16.—Blackpool T.C. Supply of 75 concrete columns and 75 decorative fluorescent lanterns for street lighting. Illuminations and Public Street Lighting Officer, Electrical Services Dept., Rigby Rd. East. (See April 23 issue.)

May 16.—Salford. Supply of electric lamps and cables required during year beginning July 1 next. Street Lighting Superintendent, 9 Frederick Rd., Pendleton, Salford.

May 18.—Carlisle. Electrical installation in 100 houses. City Surveyor, 18 Fisher St.

May 18.—Keynsham U.D.C. (*a*) Supply of 27 concrete and 7 steel columns and complete installation; and (*b*) supply of electrical equipment for street lighting along trunk road A.4. Engineer and Surveyor, Council Offices, Keynsham, Bristol. Deposit £2 2s. (See April 23 issue.)

May 18.—Southgate T.C. Supply of 134 140 W sodium lamps and 35 250 W mercury lamps for Group A street lighting on main roads. Also supply and erection of 168 concrete columns and fixing 169 lanterns, control gear, wiring, etc. (separate contracts). Borough Engineer and Surveyor, Town Hall, Palmers Green, N.13. (See April 30 issue.)

May 18.—Sunderland T.C. Electrical installation in Hylton Red House junior school. Borough Architect, Grange House, Stockton Rd. Deposit £2 2s.

May 19.—Newcastle-on-Tyne. Supply of flashing beacons for pedestrian crossings. City Engineer, Town Hall.

May 19.—Worcester. Electrical installation at Guildhall. City Engineer and Surveyor, 22 Bridge St. Deposit £2 2s.

May 20.—Evesham R.D.C. Extension of electrical service and wiring of workshops at Lansdowne. Engineer and Surveyor, Lansdowne, Port St.

May 20.—Wolverhampton T.C. Installation of sodium and fluorescent lighting in Class A, and mercury and tungsten lighting in Class B along certain streets. Borough Engineer, Town Hall. Deposit £2 2s. (See April 23 issue.)

May 22.—Belfast. Supply and erection of private automatic telephone exchange equipment. Electricity Dept., East Bridge St. Deposit £2 2s. (See April 30 issue.)

May 22.—Edinburgh. Electrical installation in 147 houses and 16 shops in Inch Development area B. City Architect, City Chambers.

May 22.—Hastings T.C. Electrical installation in extension to Hollington primary infants' school. Borough Engineer, 37 Wellington Sq. Deposit £2 2s.

May 22.—Windsor T.C. Electrical work in 54 houses in Dedworth Rd. and Kenton Lane. Borough Engineer, Kipling Memorial Building, Alma Road.

May 23.—Mitcham (Surrey) T.C. Supply and erection of equipment for improvement of street lighting along five roads. Borough Engineer and Surveyor, Town Hall.

May 25.—Farnworth T.C. Installation of electric lighting and heating in 189 houses on Plodder Lane South site. Borough Engineer and Surveyor, Town Hall. Deposit £1 1s.

May 25.—Leeds. Electrical installation in Sutton branch of Hull Royal Infirmary. Architect is J. Stinton Jones and Partners, Consultant Engineers, 21 Gloucester Place, London W.1. Deposit £2 2s.

May 25.—Galashiels T.C. Supply, erection and wiring of about 77 mercury discharge lighting points, columns, lanterns and accessories in Group A along Edinburgh-Carlisle trunk road. R. G. Nicholson, Lighting Inspector, Burgh Chambers. (See April 30 issue.)

May 25.—Lochgelly (Fife) T.C. Electrical work in seven shops and 15 houses in Main St. Surveyors, James Gentles and Son, Central Chambers, Kirkcaldy.

May 26.—East Riding. Installation of electrical services at Institute of Agriculture, Bishop Burton. County Architect, County Hall, Beverley.

May 26.—Peterhead T.C. Electrical works in 44 houses on Catto Drive site. R. D. Cruickshank, Burgh Architect, 60 Broad St.

May 26.—Roscommon. Supply and erection of two electrically operated pumping units, with accessories, for Boyle water supply. P. H. McCarthy and Son, Consulting Engineers, 26 Lr. Leeson St., Dublin. Deposit £5 5s.

May 26.—Wrexham T.C. Wiring for electric light and power in 101 houses on four sites. T. A. Bowen, Imperial Buildings, Regent St. Deposit £2 2s.

May 27.—Rowley Regis T. C. Supply and erection of 102 concrete columns and equipment in Group A, for lighting along Birmingham-Wolverhampton Rd. Also general maintenance of same. Borough Engineer and Surveyor, Municipal Bldgs., Old Hill, Staffs. Deposit £2.

May 28.—Altrincham T.C. Relighting of the market. J. D. Porteous, industrial consultant, 1 Chancery Lane, Spring Gardens, Manchester 2. Deposit £2 2s. (Advertised in this issue.)

May 29.—Colne Valley U.D.C. Supply of equipment for 69 mercury lighting units; and erection of 69 lighting units and overhead wiring along A.62 trunk road. Engineer and Surveyor, Municipal Offices, Carr Lane, Slaithwaite.

May 29.—Liverpool. Electrical installation at Ashfield St. C.P. school. City Engineer and Surveyor, Municipal Buildings.

May 29.—Slough T.C. Supply and erection of electrically driven automatically controlled booster plant, capacity 120 g.p.m., for waterworks. E. Gardner Thorpe, Borough Engineer, Town Hall.

May 30.—Bristol. Supply of electrical measuring instruments to Engineering Dept., College of Technology. G. H. Sylvester, Chief Educ. Officer, Council House, College Green.

June 1.—Alton U.D.C. Supply of three sets of electrically driven vertical unchokeable sewage pumps with ancillary equipment for treatment works pumping station. John Taylor and Sons, Artillery House, Victoria St., Westminster. Deposit £5.

June 1.—Bushey (Herts) U.D.C. Supply 80 concrete columns and 140 W sodium lanterns, lamps and ancillary equipment for improved street lighting along five roads. Engineer and Surveyor, Council Offices. Deposit £2 2s. (See May 7 issue.)

June 1.—Herne Bay U.D.C. Installation of electricity in 51 houses on Sea St. estate. W. W. Smith, Engineer and Surveyor, Council Offices.

June 3.—Dublin. Supply and erection of (*a*) three vertical spindle sewage pumps and electric motors capable of pumping 646 g.p.m., and (*b*) two storm water pumps and electric motors capable of 1,400 g.p.m. Required for N. Dublin drainage scheme (contract No. 8). City Treasurer, Exchange Buildings, Lord Edward St. Deposit £5 5s.

June 3.—Manchester. Alterations and additions to electrical installation at Newton Heath Technical College. City Architect, Town Hall. Deposit £1 1s. (See May 7 issue.)

June 5.—Oldham T.C. Supply of concrete lamp columns and electric lanterns in groups A and B. C. Worswick, Lighting Superintendent, Gas St. (Advertised in this issue.)

June 6.—Bredbury (Ches.) U.D.C. Supply and installation of 140 W sodium street lighting, including concrete columns, lanterns, lamps, control gear, etc., along 2½ miles of A.560 trunk road. Engineer and Surveyor, Council Offices, George Lane. Deposit £2 2s.

June 8.—Morley T.C. Supply and installation of sodium lighting along trunk road A.650. Street Lighting Superintendent, Town Hall. Deposit 10s. 6d. (See May 7 issue.)

June 8.—Ormskirk U.D.C. Supply and erection of 105 concrete columns, lanterns, 140 W sodium lamps, switchgear and other equipment for Group A street lighting. Surveyor, Council Offices, Burscough St. (Advertised in this issue.)

June 10.—Gateshead T.C. Electrical installation at Dryden Rd. grammar school. Applications to A. J. McGregor, Borough Surveyor, Municipal Buildings, Swinburne St., by May 18. Deposit £2 2s. (See May 7 issue.)

June 19.—Belfast. Supply, erection, etc., of 110 kV and 33 kV main cables, auxiliary cables, etc., for Municipal power station to Donegall substation (N.1235), and 33 kV main cables and accessories for Stage 2 of 33 kV distribution system (N.1236). Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See May 7 issue.)

No date stated.—Girvan (Ayr) T.C. Electric lighting in 32 houses in Mote scheme. Applications to S. Valentine, Town Clerk.

No date stated.—Ayr. Supply of equipment and erection of 11 lighting units on trunk road A.77 at Monkton. Applications for (*a*) supply of lighting and electrical equipment, (*b*) supply of steel standards, and (*c*) erection work, to County Engineer, County Buildings.

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

June 2.—India. Director-General, Supplies and Disposals, invites tenders (No. SE-1/19181-D/IV) for supply of four turbo-generators L.B.B., complete ½ kW, 32 V T.G.H. B.o.T. (Ref.: CRE 15243/53).*

June 16.—Egypt. Supply and erection of transformer substation, underground cables, switchgear, and switchboards, electric installation for lighting and ventilation for plant No. 63 of Min. of War and Marine at Helwan. Chief Inspecting Engr., Egyptian Govt., 41 Tothill St., London S.W.1.

June 16.—India. Director General, Supplies and Disposals, Shahjahan Rd., New Delhi, invite tenders (No. SE-2/25227-D/IV) for supply of four motor generator sets of 15 kW capacity and two of 10 kW capacity. B.o.T. (Ref.: CRE 15874/53).*

June 23.—Uruguay. Supply, erection, etc., of six identical generating groups of 1,500 kW each approx., comprising diesel

Your Queries — Answered

"Riley" clocks, makers of? T.B.—These were made by the Riley Clock and Instrument Co., Ltd., Eclen Corner, Saltburn, Yorks, a firm which went out of business in 1951. (25738)

"Royal" irons, suppliers of? A.C.—The non-automatic irons under this name were supplied by the Wholesale Electrical Co., Ltd., 37 Vauxhall Bridge Rd., S.W.1. (25749)

"Lovell" wringers, agents for? F.C.—Acme Wringers, Ltd., 85 David St., Glasgow. (25758)

Flat-type pocket torches of the 4·5 V battery type, makers of? T.B.—Vidor, Ltd., West St., Erith, Kent. (25766)

"Aarcon" air conditioning unit, makers of? G.P.—Air Conditioning and Refrigeration Ltd., c/o Barclays Bank, 29 Gracechurch St., E.C.3. (25773)

"Jelson" irons, makers of? L.A.—Jelson Electric Ltd., Spring Road, Tyseley, Birmingham. (25779)

"C.C.A. Poliflor" floor polisher, address for? B.S.—C.C.A. (Vacuum Cleaners), Ltd., 109 South St., Ponders End, Enfield. (25784)

"Metamec" clocks, makers of? S.E.—Metamec, Ltd., South Green, Dereham, Norfolk. (25795)

The above are selected from questions we have answered this week. If you have a query, send it to us.

CONTRACTS OPEN, OVERSEAS —(contd.)

type motor directly coupled to generator of 3-phase a.c. of 6,300 V, 50 c/s per sec. Tender No. 3853/53. Spec. No. 2196. Usinas Electricas y Telefonos del Estado.

July 8.—Australia. Supply, erection and maintenance of low-tension switchgear, rating 25,000 kVA at 400 V, for Townsville Regional Elect. Board. (Spec. No. 386.) State Electricity Commission of Queensland, Scottish Union House, Eagle St., Brisbane. B.o.T. (Ref.: CRE/14872/53).*

July 14.—New Zealand. Supply of 5,000 kVA, 33 kV, 3-phase, 50 c/s, voltage regulating transformer of outdoor type, oil immersed and with natural cooling, for State Hydro-Electric Dept. Deposit £100 and bond £160.

Aug. 19.—Australia. Supply of materials, clearing of route, and erection of 132 kV overhead transmission line for State Electricity Commission of Queensland. Spec. T.F./16 available from Agent-General for Queensland, 409-10 Strand, London W.C.2. (See May 7 issue.)

CONTRACTS PLACED

Coventry. Electrical work in erection of Calndon Castle School, Electrical Installations Ltd., £4,839.

Edmonton B.C. Electrical installation in 116 dwellings on Flamstead End estate, Holmes and Larkinson Ltd., £3,958.

Ilford T.C. First part of street lighting in Eastern Ave., General Electric Co., £7,944.

Lambeth B.C. Erection of 130 street lamp columns along four roads, General Electric Co.

Leeds. Supply of sodium lanterns and control gear, Crompton Parkinson Ltd., £1,004.

Newcastle-on-Tyne. Supply of electrical equipment to Rutherford College of Technology, N. Eastern Electricity Board, £1,155; A. Reyrolle and Co., Ltd., £708; and C. A. Parsons and Co., Ltd., £597.

Newcastle-on-Tyne. Electrical installation at Jesmond Dene House, Tanjon (Newcastle), Ltd., £2,904.

Newcastle-under-Lyme T.C. Wiring of houses at Chesterton and Silverdale. Speed Electric Service, £8,375.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	253 0 0	—
LEAD, good soft pig (foreign)... ...	77½-78½	100 0 0
TIN (99·99·76%) ... ...(Cash)	735-737½	—
,, ... (3 months)	725-730	—
ALUMINIUM, commercial purity (del.)	161 0 0	—
ZINC	68-68½	88 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	51 10 0	—
Mild Steel Tape (0·04 in.) ...	40 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Andrew Air Conditioning Co. Ltd. Resolution for voluntary winding-up passed at meeting on April 22. E. G. Clegg, 3 York St., Manchester, was appointed liquidator.

Atlantic Appliances Ltd. Meeting of members will take place at Chipchase, Wood and Jacobs, 74 Newman St., W.1, on June 5 at 11.30 a.m. to receive liquidator's report.

Patterson Lamps Ltd. At meeting on April 24, resolution passed for voluntary winding-up. J. Hutchinson, Inc. Acc., 1 St. Nicholas Buildings, Newcastle-on-Tyne, has been appointed liquidator.

H. Webb and Co. (Engineers) Ltd. Resolution for voluntary winding-up passed at meeting on April 27, when D. Morgan, Inc. Acc., 100 Park St., W.1, was appointed liquidator.

Mayor Smith, Ltd. Resolution passed at meeting on May 1 for voluntary winding-up. At subsequent meeting of creditors, Silas Oliver Henry, of 5 Rumford Place, Liverpool, was appointed liquidator.

Great Asby Electric Light and Water Co., Ltd. Creditors are asked to send particulars to A. D. Compston, of N.W. Electricity Board, Cheetwood Rd., Manchester, liquidator, by May 26. Meeting of members will take place at that address on June 22 at 3.30 p.m.

Wembley Electrical Appliances, Ltd. Last day for receiving proofs in respect of intended dividends is May 23. Liquidator is E. T. Wood, 7 and 8 Chandos St., W.1.

BANKRUPTCY ACTS

Receiving Orders

London. Alfred J. Rigby, electrical contractor, of Doughty Mews, W.C.1. Date of receiving order, May 1.

First Meeting

Leeds. Leonard Peel, electrical engineer, of 216 Low Lane, Horsforth. Receiving order dated April 28. First meeting today (Thurs.) at Official Receiver's Office, 29 The Parade, Leeds, at 11 a.m. Public examination at County Court House, Albion Pl., Leeds, on July 21 at 10.30 a.m.

Banbury. Herbert F. Thorrington, electrical contractor, of Eydon, Northants. Public examination at Town Hall, Banbury, on June 12 at 11.45 a.m. First meeting was yesterday (Wed.).

Release of Trustee

Haverfordwest. William Pickersgill, electrical engineer, trading at The Garage, Clarbeston Rd. Trustee was B. Baddiel, C.A., 20 Walter Rd., Swansea.

Dividends

Salisbury. John S. Anderson, trading as Electronic Services at Nearavon, Salisbury St., Fordingbridge. Second and final dividends of 2½d. in £, payable at Trustee's office on May 18.

TRADE NOTES

Change of Address.—Bill Switchgear Ltd. state that their representative for the Yorkshire area, Mr. N. Sharples, as from May 18, will be residing at 30 Nursery Lane, Alwoodley, Leeds. Telephone: 68, 6631.

Acquisition.—Mr. Louis Brown has now purchased the entire stocks and goodwill of G.B.M. (Electrical), Birmingham, and is carrying on the business under the same title at 439 Moseley Rd., Birmingham 12. The firm is continuing to manufacture immersion heaters and has brought out a range of lighting fittings, we understand.

BUSINESS PROSPECTS

HOME

Alnwick R.D.C. Hundred miners' houses to be erected at Shilbottle.

Basford (Notts) R.D.C. Construction of 56 houses on three sites. J. J. G. Ellis, Engineer, Surveyor and Housing Architect, Rock House, Stockhill Lane.

Basingstoke. Approval granted to erection of infants' school on Oakridge estate.

Bermondsey. It is proposed to build 302 dwellings and 6 shops on sites Nos. 12-16.

Billingham-on-Tees U.D.C. It is proposed to build houses in Corfe Crescent, and further 180 houses later. Loan sanction for £198,500 sought for 136 houses in Roseberry Road.

Bradford. Secondary school is proposed near Wibsey Park at an estimated cost of £247,500.

Brentford. Plans in hand for erection of 7 shops with 10 maisonettes in High St.

Chelmsford R.D.C. Erection of 83 houses at Gt. Baddow. Council's Estate Manager (Room 26), Council Offices, New London Rd.

Coventry. J. H. Spiers propose to build factory and offices in Torrington Avenue.

Durham. Construction of 54 flats on Sunderland Rd. estate. J. W. Green, City Engineer and Architect, Town Hall. School building programme includes ten new schools, largest being Consett grammar school, estimated to cost £212,000.

East Grinstead. Series of villas, each containing 24 bedrooms, will probably be built at Queen Victoria Hospital.

Felling U.D.C. Construction of 100 houses at Heworth. Chief Housing Officer, Council Offices.

Gateshead. Building schemes will include Hillheads secondary, Lean Lane infants, and Beacon Lough secondary schools. Also approval awaited for erection of 8-storey block of (196) flats at Barn Close.

Gosport T.C. Layout plan approved for 134 houses near Rowner estate.

Hackney B.C. Scheme for erection of 103 flats on Clapton Common site is estimated to cost £225,000.

Highworth (Wilts) R.D.C. Ministry approval sought for erection of 58 houses on Lechdale Rd. site.

Hornsey (Middx). It is suggested that Campsbourne pumping station be electrified at estimated cost of £7,500.

Huyton-with-Roby U.D.C. Erection of about 250 houses on St. John's Rd. (East) estate. Chief Architectural Asst., County Offices.

Kelton (Rut.) R.D.C. It is proposed to build further 40 houses in district.

Kettering. Work has started on £43,000 science laboratory block of the grammar school in Windmill Ave., which is to cost £109,000.

Keynsham U.D.C. Erection of 37 houses on Norman Rd. estate, Saltford. Engineer and Surveyor, Council Offices.

Leicester. Permission sought to borrow £132,780 for erection of infant and junior schools on Eyres Monsell estate.

Liverpool. Construction of 10-storey block of 114 flats at Sparrow Hall. City Architect, Blackburn Chambers, Dale St., Kingsway.

Manchester. Erection of factory for Sharston Engineering Co., Wythenshawe. Architects, Cruickshank and Seward, 334 Wellington Rd. North, Stockport.

March (Cambs.) U.D.C. Consideration being given to erection of 180 houses. Council's Architect is W. B. Pockett.

Middlesbrough T.C. Further 78 houses to be built in Park End area.

Milnrow (Lancs) U.D.C. Erection of 46 houses on Bentgate estate. Engineer and Surveyor, Council Offices, Newhey Rd.

Norwich. Construction of 160 dwellings in Hall Rd. City Architect, City Hall.

Oxford. Erection of College for Further Education, 36 flats at Rose Hill Frontage, 48 at Barton End, and primary school on Wood Farm estate. E. G. Chandler, City Architect, Town Hall.

Somerset. Approval given to building of Churchill secondary school at Weston-super-Mare.

South Shields. Erection of 102 houses on Simonside estate. Borough Engineer, Town Hall.

Stirling. Plans approved by Dean of Guild Court for erection of £60,000 factory in Kerse Rd. for Cape Asbestos Co., Ltd., 114 Park Street, London W.1.

Stoke-on-Trent. Application to be made for sanction to borrow £219,488 for Blurton county secondary school.

Sunderland T.C. Plans by N.-Eastern Trading Estates approved for erection of factory at Pallion for Bristol Aeroplane Co., Ltd.

Surrey. Fifteen new schools in West Surrey have been included in 1954-55 building programme. Chief among them are Woking girls', £168,300; Addlestone secondary, £141,250; West Byfleet Golf Course secondary, £180,000; Wrecclesham secondary, £100,000; Burpham secondary, £100,000; and Cranleigh C. of E. secondary, £140,000.

Swansea T.C. Permission to borrow £120,095 sought for erection of 82 houses on Cadle site.

Tottenham. M.W.B. recommended to approve electrification of Park pumping station. Estimated cost, £7,900.

Tynemouth. Revised plans approved for proposed £92,000 Monkhouse primary school.

Uxbridge U.D.C. Plans in hand for construction of 18 houses, 39 flats and 6 bungalows in Corwell Lane, Hillingdon.

West Ashford (Kent) R.D.C. Further 30 houses to be built at Kingsnorth.

Westminster. Scheme proposed for erection of nine-storey block of 56 flats in Ebury Bridge Rd.

Whickham (Dur.) U.D.C. Plans approved for 244 houses at Swalwell Bank and tenders being obtained. Architects, Fennell and Co., Bridge End Chambers, Chester-le-Street.

Wigston U.D.C. Fifty two-storey flats will probably be built on a site in Dukes Close.

Wycombe (Bucks). Dominion Sales (London) Ltd., 6 Finsbury Sq., E.C.2, propose to build a factory on a site at Princes Risborough.

OVERSEAS

U.S.A. Mr. R. R. Stock, Schrade-Balterson Co., 806 West Washington, Chicago, is interested in hearing from U.K. manufacturers of variable speed devices, electronic, mechanical and hydraulic.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

R. Dunn Ltd., 349 Ings Rd., Sutton-on-Hull, Yorks. To take over business of plumbers and electrical contractors, etc., carried on at Sutton-on-Hull, as "R. Dunn," by Robert Dunn and Henry Dunn. Cap.: £2,500. Dirs.: R. Dunn and H. Dunn.

Electrocrafts (Halifax) Ltd., 185 Gibbet St., Halifax. To take over business of electrician and radio engineer carried on at Halifax by A. Williamson as "Electrocrafts." Cap.: £1,000. Dir.: A. Williamson.

William Haslam Ltd., 22 Irongate, Derby. Manufacturers of and dealers in electric, gas and oil lamps, etc. Cap.: £1,000. Dirs.: R. L. Platts and W. Parker.

Plants Finance Ltd., 47 Tyneham Rd., S.W.1. Financiers of hire purchase agreements in connection with sale and purchase of dry cleaning plant, machinery and equipment; motor cars, electrical plant, wireless and television sets, etc. Cap.: £100. Dirs.: Mrs. M. G. Wilson and Mrs. F. A. Plant.

R.G.F. Products Ltd., 1a Hermon Hill, Wanstead, E.11. Manufacturers of and dealers in electrical and plastic goods and novelties, etc. Cap.: £500. Dirs.: R. H. Frankland and G. E. Finch.

South B'ham Radio Co. Ltd. 78 Edward Rd., Birmingham 12. To take over business of radio, television and electrical engineers carried on at Birmingham as "South B'ham Radio Co." Cap.: £3,000. Dirs.: L. J. Edginton and Mrs. V. W. Edginton.

Stenophone Co. Ltd., Hedley St., Maidstone, Kent. Manufacturers of and wholesalers and retailers of sound recording and reproducing media, etc. Cap.: £1,000. Dirs.: not named. Subs.: J. B. Humphreys and P. E. Bowen, 5 John Dalton St., Manchester.

J. J. Store and Co. Ltd., 76/8 Avenue Rd., Southampton. Manufacturers and dealers in, and agents for the sale and service of electrical fittings and appliances, radio, television, refrigerators and cold storage machinery, etc. Cap.: £13,000. Dirs.: J. J. Store and G. E. Coates.

Threadex (Engineers) Ltd. Mechanical and electrical engineers, ironfounders, brassfounders, etc. Cap : £100. Dir.: B. Haber. Subs.: Doris E. Tims, 558, Caledonian Rd., Holloway, N.7, and G. S. Young, 121 Broomwood Rd., Clapham Common, S.W.11.

Tidswell and Saunders Ltd., 4 Skipton Rd., Barnoldswick, Yorks. To take over business of radio and electrical contractors and dealers carried on as "Uno Engineering Company" at Barnoldswick. Cap.: £1,000. Dirs.: H. Hogarth, C. L. Tidswell and W. D. Saunders.

Ultra-Violet Ltd., 69 Gloucester Place, W.1. Manufacturers of and dealers in medical, technical, electrical and scientific lamps and apparatus, etc. Cap.: £100. Dirs.: A. J. de Castro Basto, Beryl E. Graves and Adeline V. Gosano.

Ward and Goldstone (Plastics) Ltd., 37 Brown St., Manchester, 2. Cap.: £100. Dirs.: A. A. Goldstone, S. Goldstone, E. C. Sunderland and F. E. Edmunds.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

"Aeroseal." B713,808. Class 11. Electric fans, being parts of ventilating systems. Burke and Sons Ltd., 69 High St., Belfast, N. Ireland.

Ashley. 715,230. Class 9. Switches, fitted switch holders, plugs, sockets, etc. Ashley Accessories Ltd., Morecombe Rd., Ulverston, Lancs.

Atomag. 715, 734/788,65. Class 9. Peak Mfg. Co., "Woodside," Sheffield Rd., Hatherage, near Sheffield.

Brivar. 706,348. Class 9. Electric cables, insulated wire, and fuse wire. British Valve and Electrical Accessories Mfg., Co. Ltd., 19 Cropley St., N.1.

Clearway. 715,862. Class 9. Bells and bell systems. Gillet and Johnston Ltd., 7 Union Rd., Croydon, Surrey.

Conograph. 713,164. Class 9. Electric and electronic apparatus and instruments, etc. Conograph Dictating Machine Co., 32 Victoria St., S.W.1.

Creda Elizabethan, 714,893. Class 11. Electric cooking stoves and ovens. Simplex Electric Co. Ltd., Broadwell, Oldbury, Birmingham.

Ella. 709,122. Class 9. Electrical measuring instruments. Lionel Robinson and Co., Ltd., 3 Staple Inn, W.C.1.

Pentakote. 714,453. Class 17. Insulating varnish. P. and N. Johnson (Paintmakers) Ltd., Parkside Mill, Otley Rd., Guiseley, near Leeds.

MEETINGS TO NOTE

THURSDAY, MAY 14

INCORP. PLANT ENGRS. (Newcastle-on-Tyne).—"Electrical Fuel Injection Equipment." H. J. Stoneman. Roadway House, Oxford St., 7.30 p.m.

I.E.E. (London).—Annual meeting. (Corp. members and assoc. only.) Savoy Place, W.C.2, 5.30 p.m.

FRIDAY, MAY 15

I.E.S. (Nottingham Centre).—Annual meeting at Elect. Offices, Smithy Row, 6 p.m.

MONDAY, MAY 18

INCORP. PLANT ENGRS. (Liverpool).—"Plant Maintenance Team's Visit to U.S." Colin Troup. Radiant House, Bold St., 7.15 p.m.

TUESDAY, MAY 19

I.E.E. (London Educ. Circle).—Questions night at Savoy Place, W.C.2. 6 p.m.

WEDNESDAY, MAY 20

I.E.E. (London Supply Section).—"Utilisation of Solar Energy." E. C. Bullard. Savoy Place, W. C. 2, 5.30 p.m.

I.E.E. (S.Western sub-centre).—"Design and Performance of Surge Diverters for Protection of a.c. Systems." T. F. Monaham. Faraday Hall, St. Austell.

A.S.E.E. (S.W. London Branch).—"Electrical Contracting." G. Kitchener. Guild House, 32 Worple Rd., Wimbledon, 8.15 p.m.

A.S.E.E. (Manchester Branch).—"Principles of Organisation." D. V. Burling. Engineers' Club, Albert Sq., 7.30 p.m.

THURSDAY, MAY 21

I.E.E. (Irish Branch).—Annual meeting at 28 Merrion Sq., Dublin, 3 p.m.

EXHIBITION DIARY

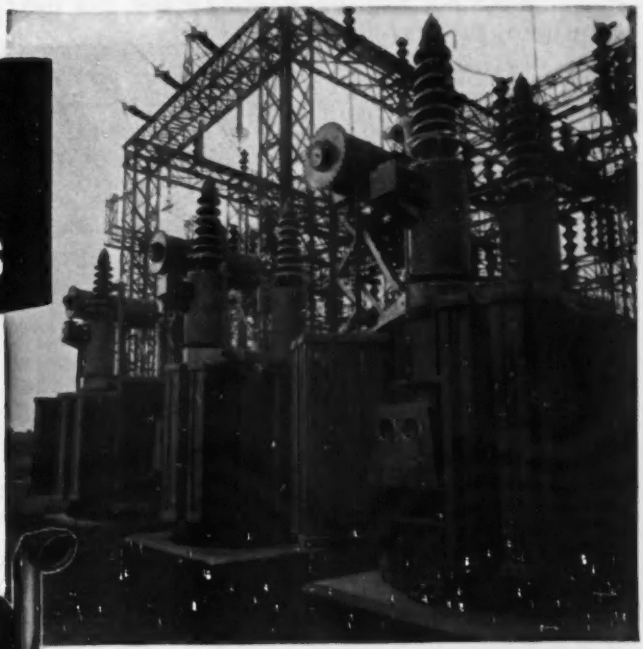
Royal Ulster Agricultural Show. Opens at Balmoral Showgrounds, Belfast, on May 27 and closes on May 30.

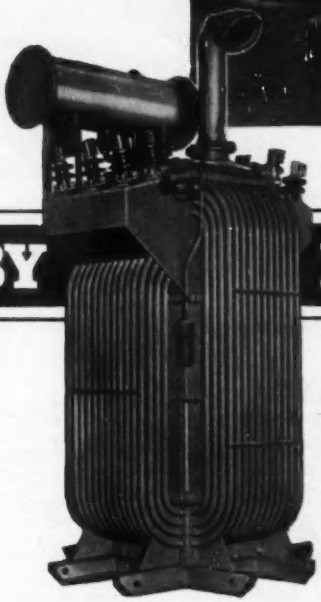
Bath and West Agric. Show to be held between June 3 and 6.

British Plastics. Opens at Olympia on June 3, continuing until June 13.

Three Counties Agric. Show will take place on The Racecourse, Hereford, between June 9 and 11.

CURRENT LIMITING REACTORS





BY HACKBRIDGE

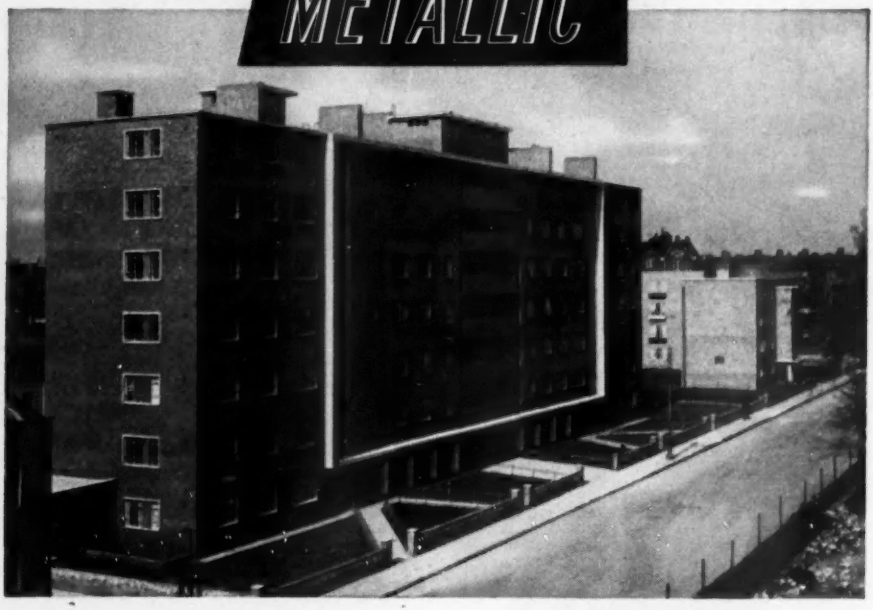
Whether magnetically or copper shielded, Hackbridge reactors embody the Hackbridge principle of unit construction: in either type the whole assembly constitutes a rigid structure of exceptional mechanical strength to withstand the largest electro-mechanical stresses met with under service conditions. Send for publication DB.18/1.

The illustrations show typical Hackbridge magnetically shielded reactors. Above: at Coventry Generating Station for introducing 18% reactance into the 90 MVA 132 kV system; and below, for introducing a 3.75% reactance into a 30 MVA 6.6 kV. system.

HACKBRIDGE AND HEWITTIC ELECTRIC CO., LIMITED
WALTON-ON-THAMES - SURREY - ENGLAND
Telephone: Walton-on-Thames 760 (8 lines) *Telegrams: "Electric, Walton-on-Thames"*

CONDUIT & FITTINGS SUPPLIED BY

METALLIC



Godwin House, St. Marys Estate, Shoreditch.

(With acknowledgement to Shoreditch Borough Council and Iverson Electrical, Ltd.)

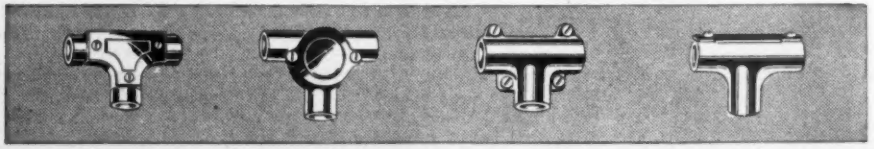
A TI COMPANY

It may be a school, it may be a factory—a power station or a housing estate, but more often than not the electrical specification will be—METALLIC.

This new block of flats is no exception, being fitted throughout with METALLIC conduit and fittings—unequalled for quality and consistent accuracy.

THE METALLIC SEAMLESS TUBE CO. LTD.

LUDGATE HILL • BIRMINGHAM • 3



ALSO AT LONDON • NEWCASTLE-ON-TYNE • LEEDS • SWANSEA & GLASGOW

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

COUNTY BOROUGH OF OLDHAM

Lighting Committee

TENDERS are invited for the SUPPLY of concrete lamp columns and electric lanterns for Group "A" and "B" lighting, in accordance with a specification which may be obtained on application to Mr. C. Worswick, Lighting Superintendent, Gas Street, Oldham.

No tender will be accepted unless it is (a) received in a plain sealed envelope which shall not bear any mark or name indicating the sender, (b) endorsed "Tender for Lighting Equipment," and (c) addressed to the Chairman of the Lighting Committee, c/o The Superintendent, Lighting Department, Gas Street, Oldham, to be delivered not later than June 5, 1953.

The lowest or any tender will not necessarily be accepted.

The contract will be subject to the Standing Orders of the Council with respect to contracts.

EDWARD HAINES,
Town Clerk.

Town Hall, Oldham.
May 5, 1953. (D 646)

BOROUGH OF ALTRINCHAM

MARKET LIGHTING SCHEME

TENDERS are invited from qualified electrical contractors for the RELIGHTING of the above market premises, in accordance with the specification, conditions and drawings prepared by and now available from J. D. Porteous, A.M.I.Mech.E. (Chartered), Industrial Consultant, 1 Chancery Lane, Spring Gardens, Manchester 2, or from the Town Clerk, Town Hall, Altrincham, on payment of a deposit of two guineas, which will be returned on receipt of a bona fide tender not subsequently withdrawn.

Tenders, prepared on the standard form of tender, accompanying specification, etc., must be submitted under cover of the envelope provided and endorsed "Market Relighting Project," by 12 noon on Tuesday, May 26, 1953, addressed to the Town Clerk, at the Town Hall, Altrincham.

The Council does not bind itself to accept the lowest or any tender.

A. GLOSSOP,
Town Clerk.

Town Hall,
Altrincham.
May, 1953. (D 675)

ORMSKIRK URBAN DISTRICT COUNCIL

GROUP "A" SODIUM STREET LIGHTING

TENDERS are invited for the SUPPLY, DELIVERY and ERECTION of 105 concrete columns, lanterns, 140 W sodium lamps, switchgear and auxiliary equipment. Specification and schedule of materials and works may be obtained from the Surveyor. Tenders in plain sealed envelopes marked "Street Lighting" to be returned to the undersigned not later than 10 a.m. Monday, June 8, 1953. Lowest or any tender not necessarily accepted.

JOSIAH TAYLOR,
Clerk of the Council.

Council Offices,
Burscough Street, Ormskirk.
May 11, 1953. (D 684)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

APPOINTMENTS VACANT

CROWN AGENTS FOR THE COLONIES

TECHNICIAN required by the Government of Northern Rhodesia in Posts and Telegraphs Department for one tour of three years in first instance with prospect of permanency. Salary, etc., in scale £807 rising to £1,041 a year. Free passages. Liberal leave on full salary. Candidates between 25 and 35 must have served a full apprenticeship with a well-established manufacturer of petrol/diesel stationary engine/alternator equipment and be competent to undertake the running maintenance of petrol and diesel driven a.c. plant with associated switchboards, also workshop major overhauls of both types of engines up to 30 b.p. They should also have a working knowledge of the operation of low-powered (500 W output) H.F.C.W. radio transmitters and receivers.

Apply in writing to the Crown Agents, 4 Millbank, London, S.W.1, stating age, name in block letters, full qualifications and experience and quoting M2C/29268/EE. (D 648)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

MAINTENANCE ENGINEER (MECHANICAL) required at Sculcoates Power Station, Hull.

Salary £787 to £816 per annum, N.J.B. Agreement, Class "G" Grade 6.

Applicants must have had a sound technical training, and preference will be given to candidates who are Corporate or Graduate Members of the Institution of Mechanical Engineers, or who hold equivalent qualifications.

Applications on Form AE6, obtainable from Divisional Secretary (Establishments), British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds, 7, to be returned within 14 days of the appearance of this advertisement.

G. A. VOWLES,
Divisional Controller.
(D 630)

CEYLON FIRE INSURANCE ASSOCIATION

THE CEYLON FIRE INSURANCE ASSOCIATION invite applications from junior engineers for the post of ASSISTANT INSPECTOR. Applicants should be about 30 years of age. They must be technically qualified, holding not less than the Ordinary National Certificate in electrical engineering or its equivalent, and have received a comprehensive general engineering apprenticeship in the electrical/mechanical fields. Practical experience in the wiring of buildings for both power and lighting installations, together with a good working knowledge of the I.E.E. Wiring Regulations essential. The work is chiefly connected with the inspection and preparing of reports on the condition of electrical-mechanical and fire extinguishing equipment in tea factories. Application forms and details of terms of engagement from the Secretary, Fire Offices' Committee (Foreign), 65 Watling Street, London E.C.4. (D 667)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

ASSISTANT SHIFT CHARGE ENGINEER is required at Meaford "A" Generating Station. N.J.B. service conditions, superannuable appointment, salary in accordance with Grade G8, commencing at £641 per annum.

Higher National Certificate in electrical or mechanical engineering required, together with sound technical training and practical experience in power station operation.

Apply on forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, by May 30, 1953. (D 649)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary, including London Allowance, and conditions of service in accordance with N.J.B. Agreement, Schedule "A" or "D."

JUNIOR ENGINEER (ELECTRICAL TEST)
Fulham Generating Station

Candidates should have had engineering training with technical qualifications to at least Ordinary National Certificate in Electrical Engineering, followed by experience in some branch of electrical test work. Salary: Class "L," Grade 20/16, £415–£552 6s. per annum.

JUNIOR ENGINEER (CONTROL ROOM)
Fulham Generating Station

Candidates should have had engineering training with technical qualifications to at least Ordinary National Certificate standard in Electrical or Mechanical Engineering. Salary: Class "L," Grade 20/16, £415–£552 6s. per annum.

OPERATION AND EFFICIENCY ENGINEER
Hackney Generating Station.

Applicants should be suitably qualified and have a number of years' experience in the operation of a large power station. Applicants should be conversant with modern methods of maintaining maximum efficiency from plant under their control. Appreciation of modern concepts of management and labour relation is necessary for this appointment. Salary: Class "F," Grade 5, £830 11s. per annum.

STATION SHIFT CONTROL ENGINEER
West Ham Generating Station

Good technical qualifications to H.N.C. Standard, or equivalent, with sound technical training and practical experience in the control and operation of steam generating plant and main switchgear in modern generating station. Salary: Class "H," Grade 10, £673 1s. per annum.

MAINTENANCE ENGINEER (MECHANICAL)
Taylors Lane Generating Station

Qualifications: Sound technical training, preferably to H.N.C. or equivalent standard, with experience in the maintenance of modern h.p. power station plant. Salary: Class "F," Grade 7, £731 17s. per annum.

ASSISTANT MAINTENANCE ENGINEER (MECHANICAL)
Taylors Lane Generating Station

Qualifications: Sound technical training with experience in the maintenance of modern h.p. power station plant. Salary: Class "F," Grade 9, £637 7s. per annum.

JUNIOR ENGINEER
Grove Road Generating Station

Qualifications: Ordinary National Certificate. General operational duties in station. Salary: N.J.B., Class "F," Grade 15/14, £415-£476 per annum.

JUNIOR ENGINEER (OPERATION)
Brunswick Wharf

Qualifications: Higher National Certificate (elec. or mech.). Experience of boiler and/or turbine operation, as position gives opportunity for supervision of turbine and P.F. boiler operation. Salary: Class "H," Grade 14, £524 per annum.

Applications may be made on form obtainable from Divisional Secretary, B.E.A., London Division, Generation House, Great Portland Street, W.1, and be received within 14 days of this advertisement. (D 683)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, an ASSISTANT to District Commercial Manager, District 345 (Caerphilly) in the Central Sub-Area.

Applicants must have had experience in the application of electricity to domestic and commercial premises and all general purposes.

Salary in accordance with Class "E", Grade 9, £587 to £593 to £630, of N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by May 23, 1953.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (D 665)

BRITISH ELECTRICITY AUTHORITY

North Western Division

STATION CHEMISTS and ASSISTANT CHEMISTS required for new generating stations at Carrington, near Manchester, and Roosecote, near Barrow-in-Furness. University degree or A.R.I.C. desirable. Minimum qualification H.N.C. Power plant experience is not essential provided applicant has extensive knowledge of chemical analysis. Experience in testing coal, water and oil an advantage. Salaries for station chemists will be £772 at Carrington (vacancy No. 92/53) and £729 at Roosecote (No. 94/53); for the Assistants (vacancy Nos. 93/53, Carrington, and 95/53, Roosecote) will depend on qualifications and experience, but will not be less than £573.

Apply, quoting vacancy number, to Establishments Officer, British Electricity House, 625 Wilmslow Road, Manchester 20, before June 3. (D 640)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 34/53.

APPLICATIONS are invited for superannuable N.J.B. appointment of GENERAL ASSISTANT ENGINEER in the Transmission Dept. of this H.Q. Salary: AX/CX.8 (£501 to £675 p.a.).

Applicants should hold H.N.C. (Elect.) or its equivalent and have experience in the maintenance of h.v. substations and overhead lines; a knowledge of 132 kV equipment an advantage.

Application forms obtainable from Divisional Secretary, British Electricity Authority, South Wales Division, Twyn-y-Fedwen Road, Gabalfa, Cardiff, should be returned by May 21, 1953. (D 632)

MIDDLESEX COUNTY COUNCIL

County Architect's Dept.

ELECTRICAL ENGINEERING ASSISTANT required. APT.III (£525–£570 p.a., plus London Weighting). Appointment at grade minimum. Established, subject to medical assessment and prescribed conditions. Able to prepare plans and specifications with practical experience in wiring installations in large buildings and design of electrical installations; also able to work with minimum of supervision. Application forms (stmpd. add f'scap env.) from County Architect, 1, Queen Anne's Gate Buildings, Dartmouth St., S.W.1, returnable by May 25 (quoting M.5 ET). Canvassing disqualifies. (D 629)

SOUTHERN ELECTRICITY BOARD

DISTRICT MANAGER

APPLICATIONS are invited for the post of Manager of the Lyndhurst District of the No. 4 (Bournemouth) Sub-Area. Provisional salary £1,325 per annum. Conditions of service and ultimate salary scale will be in accordance with such terms as may be laid down from time to time by the appropriate negotiating body.

Applicants should have a sound commercial and engineering experience gained in the management of electricity undertakings. Experience gained in a rural area would be an additional advantage.

Applications on forms obtainable from the Secretary at Head Office or from any Sub-Area Secretary, and to be returned to him at Southern Electricity House, Littlewick Green, Maidenhead, not later than May 22, 1953.

DISTRICT ENGINEER

Uxbridge District of No. 1 (Southall) Sub-Area. Salary N.J.B. Class "F", Grade 3 (£912 to £951 per annum, plus London Weighting) N.J.B. conditions of service.

The qualifications of the post are experience in the planning, construction, maintenance and operation of h.v. and l.v. networks.

Applications on forms obtainable from the Sub-Area Secretary and returned to him at 2-6 Windmill Lane, Southall, not later than May 29, 1953.

The successful candidates for the above appointments will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible. (D 666)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following positions:—

GENERAL ASSISTANT ENGINEERS
Construction Department (S/13.407)

Applicants should be in possession of technical qualifications leading to corporate membership of a recognised professional institution, preferably have had experience in a manufacturer's works, or on erection, and possess some knowledge of the layout of large switchgear or cabling installations.

Salary N.J.B. "AX/CX 8", £591 to £675.

ASSISTANT ENGINEER
(MECHANICAL MAINTENANCE)
Poole Generating Station (S/13.404)

Applicants should have experience in the maintenance of modern generating station power plant and be capable of taking control of maintenance staff and supervising turbine and boiler overhauls. Preference will be given to those possessing qualifications leading to corporate membership of a recognised professional institution. Housing accommodation may be available for the successful applicant.

Salary N.J.B. "H.9", £680 to £706.

ASSISTANT ENGINEER
(ELECTRICAL MAINTENANCE)
Weymouth Generating Station.

Applicants should have had experience in the electrical maintenance of a generating station. Manufacturing works experience will be an advantage.

Salary N.J.B. "B/9", £496 to £520.

Special application forms, obtainable from P. D. A. Oliver, Esq., Divisional Secretary, 111 High Street, Portsmouth, should be returned by May 27, 1953. (D 679)

BRITISH ELECTRICITY AUTHORITY

South Western Division

DEPUTY POWER STATION SUPERINTENDENT required at Portishead "A" Generating Station.

Superannuation scheme. Salary N.J.B. Class "J" Grade 3, £1,104 to £1,156.

Candidates should have had good technical education and considerable experience in the operation, maintenance, and administration of a large generating station, and preferably be corporate members of a recognised engineering institution.

Applications to be made on Forms AE6.ACT obtainable from the Divisional Secretary, 26 Oakfield Road, Bristol 8, to be returned by June 1, 1953. (D 664)

NORTH EASTERN ELECTRICITY BOARD

York Sub-Area

APPLICATIONS are invited for the appointment of SECOND ASSISTANT ENGINEER (Commercial) with location at Sub-Area Headquarters.

Applicants should be suitably qualified engineers with experience in all aspects of service to domestic, commercial and smaller industrial consumers. Salary, Schedule "A", Class "G", Grade 7, £729 to £758 N.J.B. conditions of service.

Applications stating age, qualifications and experience should be forwarded to the Secretary (Establishments), The North Eastern Electricity Board, Carliol House, Newcastle-upon-Tyne, within 10 days of the appearance of this advertisement. (D 669)

CROWN AGENTS FOR THE COLONIES

ELECTRICAL ENGINEER (DISTRIBUTION) required by the Malayan Central Electricity Board for appointment either (a) on agreement for 3 years in the first instance with prospect of permanent and pensionable employment; or (b) on contract for 3 years with gratuity of up to £280 a year. Free passages. Liberal leave on full salary. Candidates must have had sound training in both electrical and mechanical engineering with experience in the operation of medium Electricity Supply Undertakings and possess a competent knowledge of the maintenance of high and low tension overhead and underground a.c. distribution systems and substation plant. Candidates should preferably be Corporate Members or Graduates of the Institution of Electrical Engineers or possess degrees or other qualifications carrying exemption from the Institution's Graduate examination, and their salary, etc., would be according to qualifications and experience in scale equivalent to £1,218 rising to £2,130 a year. Candidates not so qualified may be considered and would be eligible for appointment in scale equivalent to £1,197 rising to £1,862 a year. Additional allowances ranging between equivalent to £210 and £630 a year according to salary and dependants payable to married men.

Apply, in writing, to the Crown Agents, 4 Millbank, London S.W.1, stating age, name in block letters, full qualifications and experience and quoting M2C 25016/EE. (D 681)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF THIRD ASSISTANT ENGINEER (TESTING)

Technical Section—Sub-Area Headquarters

APPLICANTS will be required to take charge of the Class "A" testing station at Barrow-in-Furness and must have had experience in a similar class of station. Preference will be given to holders of the H.N.C. (or equivalent) in electrical engineering.

Salary scale: £680-£706 p.a. Grade J.10. N.J.B. conditions.

APPOINTMENT OF SECOND ASSISTANT ENGINEER
Commercial Department—Sub-Area Headquarters

Duties will be to assist the Senior Assistant Engineer in the application of industrial tariffs and agreements, the utilisation of electricity in industry, the economics of power production, changeover from d.c. to a.c., correspondence, street lighting, and contracting.

A knowledge of domestic, commercial and rural development work and technical training to H.N.C. standard will be an advantage.

Salary scale: £817-£852 p.a. Grade J.7. N.J.B. conditions.

APPOINTMENT OF GENERAL ASSISTANT ENGINEER
Commercial Department—Sub-Area Headquarters

Duties will be to assist the Senior Assistant Engineer in domestic, commercial and rural development sales, the application of electricity in agriculture and horticulture, organisation of exhibitions, demonstrations and film shows, publicity and display, street lighting, correspondence and statistics. Industrial experience would be an added advantage.

Salary scale: £552-£573 p.a. Grade J.13. N.J.B. conditions.

Applications for the above posts to Sub-Area Manager, No. 6 Sub-Area, The North Western Electricity Board, Castle Green, Kendal, by May 23, 1953. (D 642)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 5 (Wakefield) Sub-Area

Castleford District

DISTRICT COMMERCIAL ENGINEER

Applicants, who should preferably be Corporate Members of the Institution of Electrical Engineers, must have had wide and responsible experience in the development of electricity supplies for all purposes. The successful applicant will be responsible to the District Manager for the control and administration of all commercial work in the district including electrical contracting, negotiations with industrial consumers, and Service Centres.

Salary, N.J.B., Class "E," Grade 4, £803 to £834 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a Denby Dale Road, Wakefield, not later than May 26, 1953.

No. 4 (Leeds) Sub-Area

THIRD ASSISTANT ENGINEER
(Meters, Testing and Protection)

Applicants should be Graduate Members of the Institution of Electrical Engineers or possess equivalent qualifications.

Experience in a Class "A" Meter Testing Station is essential and experience of H.V. fault location will be an advantage.

Salary, N.J.B., Class "K," Grade 10, £719 to £750 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager No. 4 (Leeds) Sub-Area, Yorkshire Electricity Board, Bramhope, Leeds, not later than May 28, 1953.

No. 1 (Bradford) Sub-Area

Bradford District

GENERAL ASSISTANT DISTRICT ENGINEER

Applicants should have passed the Graduateship Examination of the Institution of Electrical Engineers or hold equivalent technical qualifications; they should have experience in construction, operation and maintenance of high-voltage systems, underground cables, overhead lines and substations, and medium and low voltage networks.

Candidates must be prepared to reside within the District and undertake standby duties, if required.

Salary, N.J.B., Class "H," Grade 11, £607 to £628 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45-53 Sunbridge Road, Bradford, not later than May 28, 1953. (D 651)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

SECOND ASSISTANT STATION CHEMIST required in the Chemical Laboratory at Thornhill Power Station, near Dewsbury.

Applicants should hold Higher National Certificate in Chemistry and have had previous experience associated with the analysis and testing of fuels, waters and oils.

Salary £573 to £596 per annum, N.J.B. Agreement, Class "B," Grade 11.

Applications on Form AE6 obtainable from Divisional Secretary (Establishments), British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to be returned within 14 days of the appearance of this advertisement.

G. A. VOWLES,
Divisional Controller.
(D 631)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPOINTMENT OF SUB-AREA COMMERCIAL OFFICER

APPLICATIONS are invited for the above appointment based on Rhostyllen, near Wrexham, at a provisional salary of £1,375 per annum, subject to such variation as may be agreed by the appropriate negotiating body.

Candidates should be Corporate Members of the I.E.E. or possess a similar qualification.

The duties include the direction and supervision of all commercial functions including the negotiation of rural and industrial supply schemes, sales of appliances, and contracting installations in the Sub-area territory roughly bounded by Aberystwyth, Newtown, Oswestry, Wrexham, Flint and parts of South Cheshire and Shropshire.

Applications on forms obtainable from the Establishments Officer, M.A.N.W.E.B., Love Lane, Liverpool 3, should be returned not later than May 26, 1953. Please quote reference 140A. (D 628)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions within the Division:—

CIVIL ENGINEERING DRAUGHTSMEN
Construction Department, North Wilford, Nottingham
Vacancy No. 22/53

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with offices and administrative buildings.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

DRAUGHTSMAN
Transmission Department, Divisional Headquarters, Nottingham
Vacancy No. 42/53

Candidates should preferably have had experience in one or more of the following: Design and construction of high voltage sub-stations or overhead transmission lines and underground cable systems; civil engineering, electrical engineering, including layouts and diagrams for h.v. transformers and switchgear.

Salary and conditions of service will be in accordance with the National Joint Board Agreement, Grade 6 of Schedule "D" (£433 to £567 per annum) according to qualifications and experience.

ENGINEERING DRAUGHTSMEN (MECHANICAL)
Construction Department, North Wilford
Vacancy No. 44/53

Senior Draughtsmen are required in the Mechanical Section of the Construction Department at North Wilford Power Station, Nottingham. Candidates should have experience in one or more of the following:—

(i) Design and layout of power station equipment, including turbo-alternators, boiler plant, coal and ash plant, and general station auxiliaries.

(ii) H.P. and l.p. steam and feed pipework. Condensing plant and feed heating systems.

(iii) Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary and conditions of service will be in accordance with the National Joint Board Agreement, Grade 5 (£567 to £671 per annum), and Grade 6 (£433 to £567 per annum) of Schedule "D," according to experience.

MAINTENANCE ENGINEER (ELECTRICAL)
Freemen's Meadow Power Station, Leicester
Vacancy No. 50/53

Applicants should have a sound knowledge of modern power station equipment including air blast switchgear, large alternators and p.f. auxiliaries. Corporate Membership of the Institution of Electrical Engineers is desirable.

Conditions of service and salary in accordance with the N.J.B. Schedule "A," Class "H," Grade 6 (£833 to £986 per annum).

The closing date for this appointment will be May 22, 1953.

JUNIOR ENGINEER
Northampton Power Station Vacancy No. 54/53

Candidates should have a sound engineering training with subsequent experience in a modern power station, and preferably have gained an Ordinary or Higher National Certificate in Electrical Engineering.

The salary will be in accordance with Schedule "A," Class "G," Grade 15 (£407 per annum), progressing to Class "G," Grade 14 (£473 to £491 per annum).

The closing date for this appointment will be May 22, 1953.

GENERAL ASSISTANT ENGINEER
Coventry Transmission Section Vacancy No. 51/53

Applicants should have experience in the operation and maintenance of h.v. transmission lines and sub-stations up to and including 132 kV and should preferably be Graduate Members of the Institution of Electrical Engineers.

The salary will be in accordance with Class "AX/DX," Grade 8 (£501 to £694 per annum) within Schedule "C" of the National Joint Board Agreement.

The closing date for this appointment will be May 18, 1953.

STATION SHIFT CONTROL ENGINEER
Northampton Power Station Vacancy No. 56/53

Applicants should have had sound technical training and practical experience of the control and operation of steam generating plant and main switchgear, and hold a Higher National Certificate in Electrical Engineering or equivalent.

The salary will be in accordance with Class "G," Grade 10 (£608 to £630 per annum) of the National Joint Board Agreement.

The closing date for this appointment will be May 29, 1953.

The above appointments will be pensionable with the

(Continued in next column)

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provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned by the dates stated. Please quote Vacancy Number.

L. F. JEFFREY,
Divisional Controller.
(D 663)

UGANDA ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments on the permanent staff of the Board:—

(1) CHARGE ENGINEER for Owen Falls Hydro-Electric Station. Applicants should have had a sound technical training and subsequent experience in the operation of generating stations.

(2) LINESMAN with experience in construction and maintenance of wood pole lines up to 33 kV. Experience of work on steel tower lines up to 132 kV an advantage. Duties may include installation of transformers, erection of switchgear and training of African linesmen.

Commencing salary of each post within scale £754 to £1,014 (including 30 per cent. cost-of-living allowance) to be determined according to age and experience.

Free partly-furnished accommodation or allowance in lieu; free medical and dental treatment; three-year contract in the first instance, with free passage for the successful candidate and family, up to a maximum of three adult fares. Leave on full pay at end of contract.

Application forms and further information obtainable from the Board's London Office, 27 Regent Street, S.W.1. Applications should reach the Board's London Office not later than May 30.

C. R. WESTLAKE,
Chairman.

P.O. Box 559, Kampala,
Uganda, East Africa. (D 626)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

SHIFT CHARGE ENGINEER—Littlebrook Power Station (480 MW). Applicants should preferably hold an Engineering Degree or be Corporate Members of the Institution of Electrical Engineers and/or Institution of Mechanical Engineers and have had extensive experience in the operation of modern high-pressure turbine and boiler plant and E.H.T. switchgear. Considerable experience in the administration and in the control of labour is essential. Preference will be given to those with P.F. experience. Assistance with housing accommodation may be possible for those living at present in rented property. N.J.B. Conditions of Service and Salary Class M, Grade 7, £1,035 6s. 0d. per annum, including London allowance. Applications giving details of education, present position, experience, etc., should be received by the Station Superintendent, Littlebrook Power Station, nr. Dartford, Kent, by May 25. (D 625)

CENTRAL ELECTRICITY BOARD
FEDERATION OF MALAYA

ASSISTANT POWER STATION SUPERINTENDENT required, with option of appointment either (a) on agreement for three years in the first instance leading, subject to satisfactory service, to an offer of permanent employment on the pensionable establishment, with opportunity of terminating appointment at the end of first year's service if desired; or (b) on contract for three years with gratuity of £200 or £280 for each year's service according to salary. Free passages and liberal leave on full salary. Salary, etc., equivalent to £1,904, rising to £2,730 a year. Candidates must have wide experience of station maintenance and operation and preferably have held a similar position in a steam power station of not less than 80 MW capacity or as a charge engineer for at least five years in a station of not less than 120 MW capacity.

Apply in writing to the Crown Agents, 4, Millbank, London, S.W.1, stating age, name in block letters, full qualifications and experience and quoting M2C/28769/EE. (D 627)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

APPLICATIONS invited for DISTRICT COMMERCIAL OFFICER at Dingwall. Salary £700 by £25 to £775 (N.J.C. Grade 6). Superannuation scheme applicable. Applicants will require to take charge of the Commercial Department in the northern area and must be capable of dealing with the Board's tariffs and hire purchase schemes. Ability to propagate an active sales policy and familiarity with all types of domestic and hotel equipment essential. A practical knowledge of farm electrification, street lighting schemes, space heating installations, etc., would be an advantage.

Application form obtainable from Area Manager, Northern Area, Church Street, Dingwall, should be returned by May 30, 1953. (D 670)

BRITISH ELECTRICITY AUTHORITY

North Eastern Division

TRANSMISSION DEPARTMENT

APPLICATIONS are invited for the following appointments in the Transmission Department with headquarters at Mosley Street, Newcastle-upon-Tyne.

(a) THIRD ASSISTANT (CONSTRUCTION).

(b) THIRD ASSISTANT ENGINEER (MAINTENANCE).

Applicants for the appointment (a) should have had experience in layout and construction of Power Station Electrical Equipment together with associated extra high voltage substations.

Applicants for appointment (b) should have had experience in the maintenance of high voltage switchgear, overhead lines, cables and transformers.

The salary for both appointments (which are superannuable) will be in accordance with Grade 5, Schedule "C", of the National Joint Board Agreement (£649-£835 per annum) and will commence at a point commensurate with qualifications and experience.

Forms of application may be obtained from Divisional Establishments Officer, British Electricity Authority, North Eastern Division, Carliol House, Newcastle-upon-Tyne, to whom they should be returned to arrive not later than June 1, 1953. (D 680)

CITY OF BELFAST

Electricity Department

APPLICATIONS are invited for the position of:—

ENGINEERING TRAINEE (Generation) at a wage of £8 6s. 6d. per week. Applicants must possess at least a Lower National Certificate and have served a recognised apprenticeship in either electrical or mechanical engineering, or must possess a university degree in electrical or mechanical engineering.

Upon the satisfactory completion of the training period (approximately 18 months) trainees will be appointed as Junior Assistant (Shift) Engineers.

Superannuation contribution will be payable at the rate of approximately 6 per cent. on remuneration.

Canvassing in any form, oral or written, direct or indirect, will, if proved to the satisfaction of the appointing authority, disqualify a candidate for appointment.

Form of application may be obtained from the Electricity Department, East Bridge Street, Belfast, and must be returned to the undersigned not later than Friday, May 29, 1953.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
May 8, 1953. (D 680)

BRITISH ELECTRICITY AUTHORITY

North Eastern Division

APPOINTMENT OF THIRD ASSISTANT ENGINEER
Technical Department
(Protective Gear and Electrical Plant Testing)

APPLICATIONS are invited for the above-mentioned appointment with headquarters at Darlington.

Applicants should possess qualifications of at least Graduate I.E. standard and have had experience in the commissioning and maintenance of protective gear and the testing of large electrical plant.

The salary for this appointment (which is superannuable) will be in accordance with the National Joint Board Agreement, Schedule "C," Grade 5 (£649-£835 per annum), and will commence at a point commensurate with qualifications and experience.

Forms of application may be obtained from the Divisional Establishments Officer, British Electricity Authority, North Eastern Division, Carliol House, Newcastle-upon-Tyne 1, to whom they should be returned to arrive not later than May 23, 1953. (D 577)

EAST MIDLANDS ELECTRICITY BOARD

APPOINTMENT OF DEMONSTRATOR

APPLICATIONS are invited for the position of Demonstrator in the Rugby District.

Candidates should have had a Domestic Science training, including Electrical Housecraft, and should preferably hold the E.A.W. Certificate. Duties will include advising consumers on the use of domestic electrical appliances, giving demonstrations, and assisting in Service Centre duties.

The salary will be in accordance with Grade 1, £360 to £470 per annum, of the National Joint Council Salary Agreement. Progress beyond £420 per annum will be subject to a certificate that the person concerned is capable of undertaking all the duties of the Grade.

Applications, stating age, education, qualifications and experience, with details of present position, should be submitted to the Manager, Rugby District, 17/18 High Street, Rugby, to reach him not later than Friday, May 29, 1953. (D 641)

EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

Headquarters, Wherstead, Ipswich. 27/53.N

PRINCIPAL ASSISTANT, ADMINISTRATION

Candidates should have had a wide experience in attendance at meetings, drafting and preparation of minutes, reports and agenda papers, and in general administrative duties.

Salary in accordance with Grade 7 (£775 by £30 to £985) of the National Joint Council Salary Agreement.

Apply within ten days to the Secretary, Eastern Electricity Board, Wherstead, Ipswich, Suffolk.

Hendon District, Northmet Sub-Area. 32/53.R

JUNIOR ENGINEER

Candidates should have had a good general and technical education and preference will be given to holders of the Ordinary National Certificate in Electrical Engineering.

Salary in accordance with Class "F," Grade 15 of the National Joint Board Salary Agreement, commencing at £390 plus London Allowance.

Apply within fourteen days to the District Manager—Hendon, Eastern Electricity Board, 137 Brent Street, London N.W.4.

Clacton District, Suffolk Sub-Area. 33/53.R

DEMONSTRATOR

Candidates should have had domestic training including electrical housecraft, and should preferably hold the E.A.W. Certificate. They should be competent to plan and give cookery demonstrations, including lectures and advice to consumers on the utilisation of domestic electrical appliances. Previous experience in an Electricity Service Centre is desirable.

Salary in accordance with Grade 1 (£360 by £20 to £460 by £10 to £470) of the National Joint Council Salary Agreement, although progress beyond £420 will be subject to a certificate that the person concerned is capable of undertaking all the duties of the grade.

Apply within fourteen days to the District Manager—Clacton, Eastern Electricity Board, 56-58 Station Road, Clacton-on-Sea, Essex.

Future salary and conditions of service for the above appointments will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidates will be required to contribute to a superannuation scheme, and may be required to undergo a medical examination.

Applications, by letter, should contain details of age, education, qualifications, experience and present appointment and salary. (D 668)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following vacancies in the Construction Department:—

(a) THIRD ASSISTANT ENGINEER (BUILDINGS), £649-£835.

(b) GENERAL ASSISTANT ENGINEER (BUILDINGS), £501-£675.

Applicants for appointment (a) should preferably be A.R.I.C.S. with a knowledge of steel and concrete work, or A.M.I.Struct.E. with a good knowledge of building construction.

Candidates should be experienced in structural surveys and the preparation of reports. Experience in the supervision of contract and direct labour work is also necessary.

For appointment (b) candidates should possess an Intermediate R.I.C.S. (Quantities Sub-Division) or H.N.C. (Buildings). Experience in the preparation of bills of quantities and specifications is necessary and candidates should be able to supervise the measurement of building and civil engineering works.

Special application forms, obtainable from P. D. A. Oliver, Esq., Divisional Secretary, 111 High Street, Portsmouth, should be returned by May 27, 1953. (D 682)

JERSEY ELECTRICITY CO. LTD.

DEPUTY MANAGER

THE above post will be vacant shortly and immediate applications are invited from qualified Electrical and Mechanical Engineers within the age limits 35 to 42.

The Company supplies the whole of Jersey, it operates a Diesel station of 15 MW capacity, has approximately 17,000 consumers and has a large electrical contracting and refrigeration department.

Applicants, who should have comprehensive engineering and administrative experience in the supply industry, can be assured that the post offers plenty of scope and responsibility. Commencing salary will be £1,200 to £1,300 per annum.

Previous applications received in response to this advertisement will still be considered and re-application need not be made.

Applications, which must be by letter, should be endorsed "Deputy Manager" and addressed to the Manager, Jersey Electricity Co., Ltd., 11 Broad Street, St. Helier, Jersey, C.I. (D 624)

SURREY COUNTY COUNCIL

County Architect's Department

APPLICATIONS are invited for the appointment of ELECTRICAL ENGINEERING ASSISTANT, Grade II, at a commencing salary of £495 per annum, rising by annual increments of £15 to a maximum of £540 per annum, plus London allowance of up to £30 per annum, according to age.

Applicants should be neat and accurate draughtsmen, with experience in the layout and design of electric lighting and power services in buildings, and should be in possession of the National Certificate in Electrical Engineering.

The appointment will be subject to the provisions of the Local Government Act, 1937, and the successful applicant will be required to pass a medical examination.

Applications, stating age, qualifications and experience, and accompanied by copies of three recent testimonials, should be sent to the County Architect, Surrey County Council, County Hall, Kingston-upon-Thames, not later than May 30, 1953.

Canvassing, either directly or indirectly, will disqualify a candidate from consideration.

W. W. RUFF,
Clerk of the Council.

County Hall,
Kingston-upon-Thames. (D 647)

COUNTY OF LEICESTER

ENGINEERING ASSISTANT, Electrical, A.P.T. Grade VI/VII (£670 to £785) required from September 1, 1953. Must have passed Section B Examination of Institution of Electrical Engineers or Higher National Certificate in Electrical Engineering with five years' experience. Medical examination necessary. Post pensionable. Consideration given to registered disabled persons. Apply by June 15 on forms obtainable from County Architect, 123 London Road, Leicester. (D 650)

A WALSALL firm of engineers wishes to engage a CONSULTANT on the technicalities and manufacture of voltage regulators. Practical experience is all-important.—Box No. 2653, Electrical Times. (D 644)

ACCOUNT CLERK required by old-established West End firm of Electrical Installation Contractors. Duties would include incoming and outgoing accounts and wages. Experience in electrical industry essential. Good commencing salary and prospects for man with initiative.—Box No. 2651, Electrical Times. (D 652)

AMBITIOUS ENGINEERS who wish to make a progressive career in the development of modern domestic appliances are required by a well-known company in the north-west of England. Essential qualifications are three years experience of the manufacture and detailed design of cookers, washing machines, food mixers and other automatically controlled motor driven domestic appliances. Arrangements will be made to house the successful candidates.—Applications, quoting reference D.E.B., to Box No. 2647, Electrical Times. (D 633)

AN ASSISTANT ELECTRICAL ENGINEER for installation and maintenance work, age 23 to 26 years. Candidates should hold a university degree in electrical engineering and have served a graduate apprenticeship. A knowledge of instrumentation, automatic control and electronics would be advantageous.—The post is at our Yorkshire factory, but replies should be addressed to the Chief Personnel Officer, Pilkington Brothers Ltd., St. Helens, Lancashire. (D 643)

BRITISH ELECTRICITY AUTHORITY, Generation Design Branch, require SENIOR ASSISTANT ENGINEERS in the General Design and Layout Section at Headquarters in London. Candidates, who should preferably be corporate members of an appropriate professional institute, must be widely experienced in modern power station design and layout and have had experience in a design office handling power stations or associated plant. Practical experience in either operation or construction would be an advantage. Duties will be to investigate and co-ordinate proposals for the general design and layout of power stations throughout the country. Salary N.J.B. Grade 1, £1,002 to £1,378 inclusive.—Applications stating age, qualifications, experience, present position and salary to D. Moffat, Director of Establishments, Winsley Street, London W.1 by June 1, 1953. Quote reference AE/380. (D 661)

DRAUGHTSMEN (SENIOR) required. Experience in any of the following: Design of circuit breakers and of metalclad switchgear, contactors and controllers, switch and control-board layout or diagrams of connections. Applications from good mechanical draughtsmen are also invited. Good remuneration for experienced men.—Reply, quoting "Switchgear," stating age, experience and salary required, to Staff Manager, General Electric Co. Ltd., Witton, Birmingham 6. (D 654)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

ELECTRICAL RESEARCH AND TESTING ENGINEERS

A. REYROLLE AND CO. have a number of vacancies for engineers to be engaged on **electrical research and laboratory testing** in connection with switchgear, protective gear, insulation, etc. For certain of the vacancies an honours or pass degree is required; for the others a Higher National Certificate is adequate. Some of the vacancies are in connection with a large new project shortly to be put into operation. The work will be varied and interesting, and there will be good scope for advancement. Starting salaries in accordance with age, technical qualifications and experience.—Apply with full particulars to

THE CHIEF ENGINEER, A. REYROLLE AND CO. LTD., HEBBURN, CO. DURHAM.

(D 586p)

DOULTON AND CO., LTD., require for their Tamworth works an INSULATOR PRODUCTION MANAGER, to be entirely responsible for all manufacturing departments. Previous experience in a similar capacity essential, together with technical knowledge, drive and initiative. Salary in accordance with qualifications and experience, and the successful applicant will be eligible for the Company pension scheme. A house can be provided if necessary.—Applications, in writing, should be addressed to Mr. R. A. Burgess, Doulton and Co. Ltd., Wilnecote Works, Tamworth. (D 653)

ELECTRICAL ENGINEERING DRAUGHTSMAN required by Tees-side firm of engineers for the power and lighting installations of their various contracts. The work will include the preparation of control schemes, wiring diagrams and contract requisitioning of equipment.—Apply, stating age, experience and qualifications to Box No. 2655, Electrical Times. (D 671)

ELECTRICAL ENGINEER required as general technical assistant in Overhead Line Insulator Department. Duties will be connected primarily with technical aspects of design and manufacture. The post is superannuable and offers opportunities for promotion. Degree in Electrical Engineering is an essential qualification and a recognised apprenticeship with a large industrial manufacturer desirable. Age 25-30. Salary according to age, experience and qualifications.—Replies to be addressed to Chief Personnel Officer, Pilkington Brothers Ltd., St. Helens, Lancashire. (D 685)

ESTIMATING ENGINEER required for battery traction sales. Electrical Degree or Higher National Certificate essential. Previous experience in similar job an advantage, but not essential. Age not over 30. Permanent post carrying pension for suitable applicant.—Apply by letter in first instance, outlining experience and salary desired to Commercial Manager, Nife Batteries, Redditch, Worcs. (D 568)

EWBANK AND PARTNERS, LTD., have vacancies for the following:—

MECHANICAL ENGINEERING DRAUGHTSMEN experienced in power station design and layout, pipework layout, circulating water systems, and with some knowledge of coal and ash handling plants.

ELECTRICAL ENGINEERING DRAUGHTSMEN experienced in power station and substation distribution systems.

The positions are permanent and are pensionable. Free lunches are provided and a five-day week is in operation.—Applicants should write in the first instance, stating age, details of experience and salary required, to the Secretary, Ewbank and Partners Ltd., Engineering Consultants, 10-11 Grosvenor Place, London S.W.1. (D 591)

FOSTER TRANSFORMERS, LTD., South Wimbledon, S.W.19, require SENIOR DRAUGHTSMEN for work on power transformers ranging from 100 kVA to 3,000 kVA, 66,000 V. Ordinary National Certificate in electrical engineering preferred. Good working conditions. Annual bonus in addition to generally recognised pay rates.—Apply in writing to the Personnel Officer. (D 593)

LABORATORY ASSISTANTS for the development of instruments, meters and relays. University Degree or Higher National Certificate standard required.—Apply in writing, stating age, experience and salary required, etc., marking envelopes "Meter Engineer," to Personnel Manager, Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester 17. (D 383)

LEADING ELECTRICAL MANUFACTURER in the North-west seeks to recruit one or possibly two WELDING ENGINEERS to form the nucleus of a welding engineering section.

THE FIRST, who should have been trained primarily as an electrical engineer, will be required to design and develop a.c. and d.c. arc welding equipment.

THE SECOND, who should have been trained primarily as a metallurgist, will be required to carry out experimental and development work on all problems arising from the application of arc welding to ferrous and non-ferrous materials.

A qualified applicant experienced in both electrical and metallurgical aspects of welding would receive first consideration. The posts are permanent and pensionable, and arrangements will be made to house the successful applicant.—Reply to Box No. 2657, quoting Ref. AABB, Electrical Times. (D 672)

LONDON MANAGER required by E.H.T. Switchgear Manufacturers. Essentials are: (a) comprehensive experience in the high voltage switchgear industry, (b) ability to establish and maintain contacts with top-grade executives; (c) first-class sales record; (d) A.M.I.E.E. or equivalent.—Applicants should state age, technical education, previous experience and salary required to Box No. 2645, Electrical Times. (D 621)

MINISTRY OF SUPPLY requires DESIGN ENGINEERS at Harwell to assist on design problems of control and instrumentation for new types of reactors. Qualifications: British of British parents. Recognised electrical apprenticeship or equivalent training instrumentation or electronics, and A.M.I.C.E., Mech.E. or E.E., or exempting qualifications. Experience in design and installation of instrumentation and control systems and servo mechanisms. Salary and grade according to age, qualifications, experience, within £597 (Eng. III, age 25) to £1,454 (Eng. I, max.). Housing accommodation available later if married. Not established, but opportunities to compete for establishment may arise.—Application forms from M.L.N.S. Technical and Scientific Register ("K"), 26 King Street, London S.W.1, quoting D 186/53A. (D 655)

MINISTRY OF SUPPLY requires ENGINEERS (electrical) at Harwell to assist design, planning, construction of electric plant and services for large new project. Qualifications: British of British parents. Recognised engineering apprenticeship and A.M.I.C.E. or Mech.E. or Elec.E., or exempting qualifications. Experienced in design, specification, commissioning of electrical engineering plant. Salary: Within £928 to £1,454. Housing accommodation available later if married. Not established, but opportunities to compete for establishment may arise.—Application forms from M.L.N.S., Technical and Scientific Register ("K"), 26 King Street, London S.W.1, quoting D 187/53A. (D 656)

PROFESSIONAL ENGINEERS IN VARIOUS GOVERNMENT DEPARTMENTS. The Civil Service Commissioners invite applications for about 150 pensionable posts in a wide variety of mechanical and electrical engineering duties. Applications may be accepted up to September 30, 1953, but an earlier closing date may be announced.

Candidates must be under 35 on January 1, 1953, with extension for regular service in H.M. Forces and up to two years for permnent civil service. For the Post Office they must be at least 21, for the Ministry of Supply and Ministry of Civil Aviation at least 23, and for all other Departments at least 25 on that date.

Generally, a candidate must possess a University degree in Engineering or be a Corporate Member of one of the professional institutions—Mechanical Engineers, Electrical Engineers, or Civil Engineers, or have passes in, or exemption from, Sections A and B of the corresponding Associate Membership examinations. Exceptional candidates of high professional attainment, but without the specified qualifications, may be admitted. For some posts Associate Fellowship of the Royal Aeronautical Society or an Honours degree in Physics will be accepted.

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May 8, 1953. (D 662)

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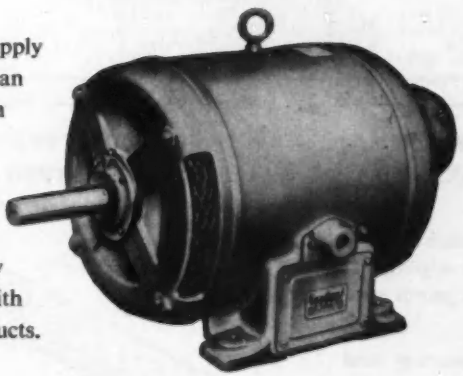

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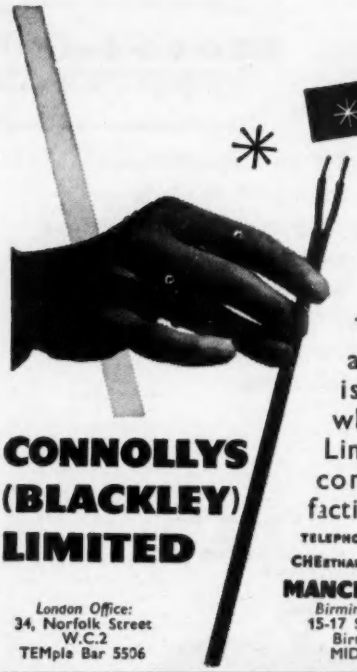

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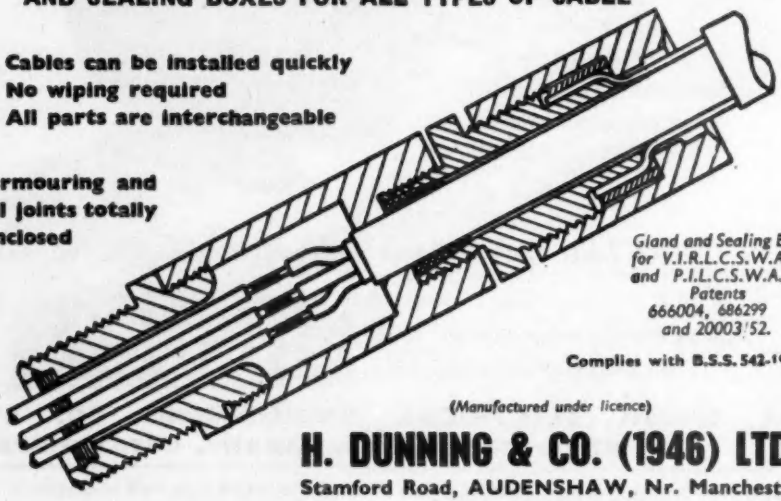

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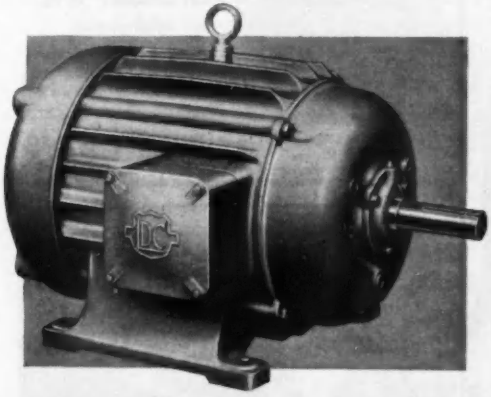

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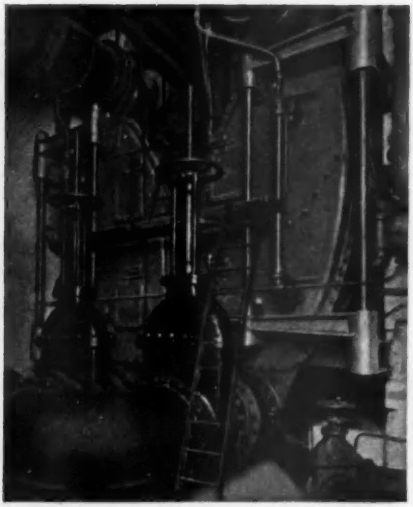

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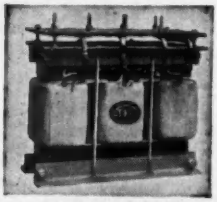

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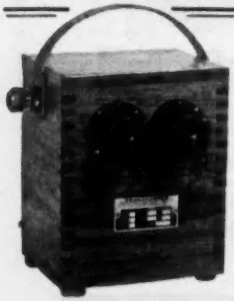

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(right) *Another example of Revo "Festival" lanterns on Revo "Scopas" concrete columns erected on an island site at Dudley.*

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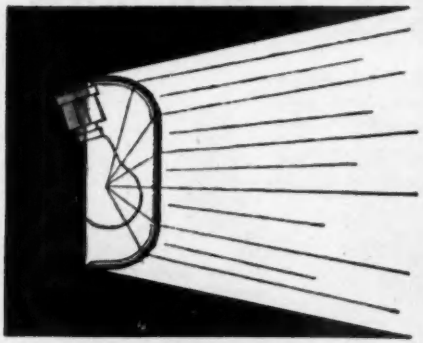

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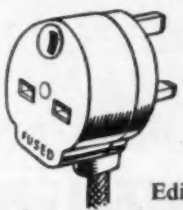

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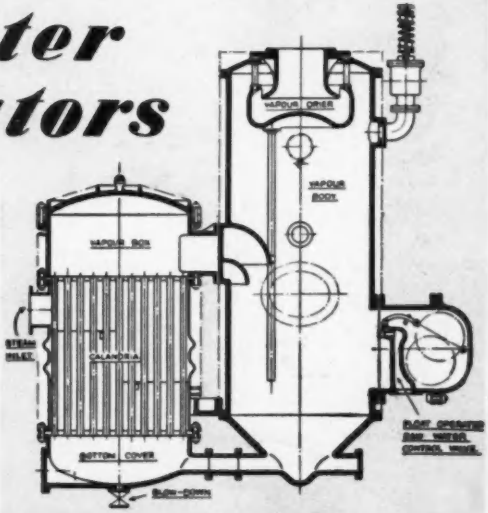

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